TITLE I OF THE OCEAN DUMPING BAN ACT OF 1988

HEARINGS

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT
AND INVESTIGATIONS,
SUBCOMMITTEE ON FISHERIES AND WILDLIFE
CONSERVATION AND THE ENVIRONMENT,
AND THE
SUBCOMMITTEE ON OCEANOGRAPHY
AND THE GREAT LAKES
OF THE

COMMITTEE ON
MERCHANT MARINE AND FISHERIES
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

IMPLEMENTATION OF TITLE I OF PUBLIC LAW 100-66, THE OCEAN DUMPING BAN ACT OF 1988

May 16, 17, 1989

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TITLE I OF THE OCEAN DUMPING BAN ACT OF 1988

TUESDAY, MAY 16, 1989.

House of Representatives, Subcommittee on Oversight and Investigations, Subcommittee on Fisheries and Wildlife Conservation and the Environment, Subcommittee on Oceanography and the Great Lakes, Committee on Merchant Marine and Fisheries,
Washington, DC.

The subcommittees met, pursuant to notice, at 1:40 p.m., in Room 1334, Longworth House Office Building, the Honorable Thomas M. Foglietta (Chairman, Subcommittee on Oversight and Investigations) presiding.

Members present: Representatives Foglietta, Hughes, Hertel, Carper, Manton, Brennan, Hochbrueckner, Pallone, Unsoeld, Davis, Schneider, Saxton, Coble, and Goss.

Staff present: Phil Rotondi, Joan Bondareff, Nancy Tyson, Lisa Pittman, Peter Marx, Tom Kitsos, Kurt Oxley, Chris Dollase, Mike Haas, and Brook Ball.

Mr. Foglietta. The subcommittees will come to order.

OPENING STATEMENT OF HON. THOMAS M. FOGLIETTA, A U.S. REPRESENTATIVE FROM PENNSYLVANIA, AND CHAIRMAN, SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

Mr. Foglietta. Good afternoon. The Subcommittees on Oversight and Investigations, Oceanography and the Great Lakes, and Fish and Wildlife Conservation and Environment are here today to receive testimony on the implementation of Title I of Public Law 100-66, "the Ocean Dumping Ban Act of 1988."

Last year, the Merchant Marine Committee, the Congress, and the Administration moved forward to confront one major environmental issue—the ocean dumping of sewage sludge and industrial waste—head on.

The Ocean Dumping Ban Act is straightforward. It bans ocean dumping after December 31st, 1991. Most importantly, the Ocean Dumping Ban Act sets up a fee and penalty schedule to ensure that administration and enforcement is effective, and that dumpers not able to meet the December 31st, 1991 deadline are out of the ocean at the earliest possible date thereafter.

Increasingly, we witness mass mortalities of our marine mammals. Increasingly, we witness algae blooms in areas of our oceans where they had never occurred before. Increasingly, we find our beaches being closed because of debris and contamination. In short, we are seeing the "Silent Spring" of our oceans.

Ending ocean dumping permanently is the single most important step that we can take, and can take now, to reverse the decline of our oceans. And I pledge that our subcommittees will be vigilant in monitoring the enforcement of this very important law.

Mr. **Foglietta**. Before I yield, opening statements, as you know, are limited to one minute. Full statements, without objection, will be entered into the record. Given our time constraints, this will maximize our time for witnesses' statements, and questions.

With that, I yield to the gentlelady from Rhode Island, the ranking minority member of the Oversight and Investigation Subcommittee. Miss Schneider.

OPENING STATEMENT OF HON. CLAUDINE SCHNEIDER, A U.S. REPRESENTATIVE FROM RHODE ISLAND

Miss **Schneider**. Thank you, kindly, Mr. Chairman, and I would like to especially thank you for agreeing to my request to hold this hearing today. I think that it is very timely that we check up on how we are doing. There are many issues that we will be addressing through this hearing, both today and tomorrow, but we have to remember that probably the most important part of the Ocean Dumping Act, which takes precedent over all else, is that—and I would like to quote from the Act. "After December 31, 1991, it shall be unlawful for any person to dump into ocean waters, or to transport for the purpose of dumping into ocean waters sewage sludge or industrial waste."

The Ocean Dumping Ban Act which was signed into law last year clearly directed the EPA, that it is the will of Congress to stop ocean dumping as soon as possible, and certainly no later than 1991.

And the law takes a two-track approach, first, using interim alternatives to stop ocean dumping by 1991, and for an organized methodical approach to implement long-term environmentally sound land-based alternatives just as soon as possible.

And then, too, EPA must keep New York City's feet to the fire, as well as some of the other dumpers that are involved, in order that we resolve this problem by the end of 1991, if not sooner.

I am quite confident that with the expert witnesses that we have here today who will be sharing some of their insight with us, that we will have a clearer picture as to where this committee needs to go, and where, of course, the dumpers need to go.

Thank you very much, Mr. Chairman.

Mr. **Foglietta**. I thank the gentlelady. Now we will hear from our co-Chairman of this meeting. Mr. Hertel.

OPENING STATEMENT OF HON. DENNIS M. HERTEL, A U.S. REPRESENTATIVE FROM MICHIGAN

Mr. **Hertel**. I want to thank the Chairman——

Mr. **Foglietta**. Excuse me, if I may. He is the Chairman of the Subcommittee on Oceanography and the Great Lakes.

Mr. **Hertel**. I just want to commend you, Mr. Chairman. I think that by having the three subcommittees joined together today, it shows the great interest the Congress has had, in a continuing way, that represents, really, the best possible response to the citizens' great concerns, and the vigilance of these three subcommittees in this area will continue, I think, to make progress, and to oversee what is being done in the closest possible way.

Mr. FOGLIETTA. Thank you, Mr. Chairman. And from New Jersey's 13th congressional district, Mr. Saxton.

OPENING STATEMENT OF HON. JIM SAXTON, A U.S. REPRESENTATIVE FROM NEW JERSEY

Mr. SAXTON. Mr. Chairman, thank you very much, and it goes without saying that I commend you and the ranking member, Miss Schneider, for calling this hearing. Let me just first emphasize that the dumping of sewage sludge in the ocean, as we have said over and over, in the years that I have been here, must stop as soon as possible.

I think it would be important today, that we try to be as specific as we can, and let me just talk some numbers.

In the past 65 years, the ocean has served as a municipal sewage sludge dump. In 1987, over 8 million wet tons of sewage sludge were dumped into the 106-mile site, and, roughly, that is equivalent to 18 pounds per second in 1987.

That is a lot of "stuff", especially when the "stuff" contains such things as copper, cadmium, mercury, PCBs, and lead, substances which are known to be toxic in many marine organisms.

Secondly, a comprehensive monitoring and research plan must be implemented as soon as possible, and again, let's be specific and talk numbers.

The year 1987 was an unprecedented year of disaster for marine mammals. Last week, we learned about the 740 bottlenose dolphins which died and washed ashore along the Atlantic Coast. Approximately 111 of those strandings were on New Jersey's coast—my home State—containing some of the highest levels of dangerous pollutants like PCBs and DDTs, that have ever been found in marine mammals.

Third and last, the long-term land-based alternatives must be responsibly and carefully considered before they are implemented. Let's talk numbers one more time.

In 1966, there were 66 permitted dumpers of chemical wastes and sewage sludge in the ocean. In 1989 there were no dumpers of chemical wastes and just nine dumpers of sewage sludge. That appears to be real progress.

And by March 17, 1991, I look forward to seeing the six New Jersey dumpers totally out of the ocean, and putting into place other types of alternatives for disposal of sludge. The three remaining New York dumpers hopefully will follow suit soon thereafter.

So I thank the witnesses for being here, and I look forward to working closely with the Chairman and the ranking member during this hearing.

Mr. FOGLIETTA. I thank the gentleman, and from Maine's first congressional district, Mr. Brennan.

OPENING STATEMENT OF HON. JOSEPH E. BRENNAN, A U.S. REPRESENTATIVE FROM MAINE

Mr. **Brennan**. Thank you, Mr. Chairman. Just very briefly. We have no business whatsoever using the ocean as an open sewer. We have a lot more responsibility than that, and I am very pleased that we passed the legislation last year that will prohibit ocean dumping in about 2 years. Thank you.

Mr. **Foglietta**. Thank you. From North Carolina's sixth district. Mr. Coble.

Mr. **Coble**. No opening statement, Mr. Chairman.

Mr. **Foglietta**. Thank you, sir. From the State of New Jersey, Mr. Pallone.

OPENING STATEMENT OF HON. FRANK PALLONE, JR., A U.S. REPRESENTATIVE FROM NEW JERSEY

Mr. **Pallone**. Thank you, Mr. Chairman. I want to commend you, again, and the other co-chairmen for having this hearing today, particularly because I have very serious concerns about the way that both Federal and State agencies are carrying out the provisions of this Act.

I just want to mention two things in my opening statement. One, that I am extremely distressed that the EPA has not adopted specific criteria that regulates the quality of sludge dumped into the ocean.

If you do not start cleaning up the sludge now, you never will get sludge clean enough for beneficial uses. Pretreatment, in my opinion, is the key.

The EPA should say that sludge cannot go to the ocean unless it has a certain toxic standard or meets certain standards, and that would force pretreatment.

My second point is that both the EPA and the New Jersey DEP, in my opinion, have not demonstrated any significant commitment to find land-based alternatives that make the most sense from an environmental point of view.

Specifically, I want sludge re-used, not incinerated or land-filled. For New Jersey, the land-fill option is probably not viable in the long-run anyway. At some point, Pennsylvania, for example, will no longer take New Jersey sludge. Incineration will be objectionable to many people, particularly with high levels of toxicity. I think we must encourage re-use through composting and other options. Otherwise, we will be back in the ocean through the force of public opinion that is opposed to incineration.

Thank you, Mr. Chairman.

Mr. **Foglietta**. I thank the gentleman, and from Washington's third congressional district, Ms. Unsoeld.

OPENING STATEMENT OF HON. JOLENE UNSOELD, A U.S. REPRESENTATIVE FROM WASHINGTON

Ms. **Unsoeld**. Thank you, Mr. Chairman. No opening remarks except to commend you all for having done a fine job of passing this before I had a chance to get here. We do not have the same problems, quite yet, in the Northwest, that you have discovered on your shores, but look forward to carrying this through the next step. So thank you for your leadership.

Mr. **Foglietta**. I thank the gentlelady. Are there any statements for the record from any of the members?

[The statement of Mr. Manton follows:]

Prepared Statement of Hon. Thomas J. Manton, a U.S. Representative from New York

Mr. Chairman, as Members of the Merchant Marine and Fisheries Committee, we have a responsibility to ensure the provisions of the Ocean Dumping Ban Act are effectively and efficiently implemented in accordance with Congressional intent to safeguard our coastal waters. We also must work to assure the necessary resources are available for the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the Coast Guard to enable them to fulfill their mission under this law.

During the 100th Congress, we demonstrated our continuing interest in maintaining the integrity and viability of our coastal waters by passing the Ocean Dumping Ban Act. This law will bring to an end as expeditiously as possible the ocean disposal of municipal sewage sludge and industrial wastes. While I believe this action will not get at the basic causes of the pollution we have experienced along the beaches of New York and New Jersey, it is a starting point for addressing the more pressing problems which our coastal waters are experiencing.

Mr. Chairman, while I commend you for holding these hearings, I hope these hearings will not be used to re-open this very contentious issue. I believe these hearings should only serve to ensure the process is proceeding as envisioned by those of us who worked diligently over the past year and a half to resolve this issue in a fair and responsible manner.

As we have learned over the past several years, coastal pollution is not going to go away in a year or two, and the solutions will cost many billions of dollars. It is a vast and complex problem—and includes direct discharges into our estuaries and coastal waters, and combined sewer overflows. This problem is further compounded by an array of non-point sources of pollution.

Mr. Chairman, I understand the EPA's Region 2 office is confident the process is generally proceeding on schedule. I am impressed with the process EPA and the dumpers have made. And, I commend the Acting Regional Administrator, Mr. Muszynski, and his Region 2 office for their fine work. However, I am concerned with two recent reports concerning the New Jersey sewage authorities and EPA's Inspector General's office.

The suit recently brought by the New Jersey authorities raises the very serious question of whether they are actively pursuing realistic alternatives to ocean dumping; or, whether the EPA is properly interpreting specific provisions of the Ocean Dumping Ban Act. I hope today's witnesses can shed some light on this situation.

Also, certain aspects of the recent report of the EPA Inspector General trouble me. While the thrust of the report properly emphasizes the importance of expanding research and monitoring related to the 106-site and points out specific improvements that could be made, much of the report impresses me as being "a day late, and a dollar short." The report also appears to place undue reliance on hearsay and unsubstantiated newspaper accounts, while ignoring a wide body of documented scientific studies.

Mr. Chairman, I believe we need to determine what aspects of the IG's report are accurate and should be implemented. We also need to learn which actions the EPA already has taken to correct any short-comings in the ocean dumping program. I look forward to the EPA's response to the Inspector General's report.

Mr. Chairman, the 1989 beach season is almost upon us, and the American people are anxious about the quality of our coastal waters. I remain confident today's hearing will help in allaying these fears. However, I believe we will continue to face serious problems on our beaches so long as we ignore the more pressing problems of CSO's and direct discharges.

Mr. **Foglietta**. If there are no further statements, I have the testimony of Mr. Andrew O'Rourke of Westchester County, New York, County Executive, which I will submit for the record, without objection.

[The statement of Mr. O'Rourke can be found at end of hearing.]

Mr. FOGLIETTA. I now would like to call our first panel. Mr. William Muszynski was supposed to have been here but he is delayed, and will be replaced by Mr. Bruce Kiselica. Mr. Tudor Davies of the EPA; Mr. Hal Stanford of the National Oceanic and Atmospheric Administration; and Captain Charles Folsom of the United States Coast Guard. Welcome, gentlemen.

Which of you would care to start the testimony?

STATEMENT OF DR. TUDOR DAVIES, DIRECTOR, OFFICE OF MARINE AND ESTUARINE PROTECTION DIVISION, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY BRUCE KISELICA, CHIEF, OCEAN DUMPING TASK FORCE, REGION II; WILLIAM MUSZYNSKI, ACTING REGIONAL ADMINISTRATOR, REGION II, ENVIRONMENTAL PROTECTION AGENCY

Dr. DAVIES. Let me begin. My name is Tudor Davies, and let me apologize for Bill Muszynski not arriving at this time. He is en route, and we hope, momentarily, that he will walk in here and be available for discussion with you on this important issue.

In the meantime, I have with me Mr. Bruce Kiselica, who is also from the Region II of EPA, and is the Chief of the Ocean Dumping Task Force that has been acting to implement the Ocean Dumping Ban Act.

Let me briefly summarize the testimony and hope that Bill will arrive by the time the testimony of the panel is complete.

I am pleased to inform you that since passage of the Ban Act, EPA has been conducting a very vigorous effort not only to carry out——

Mr. FOGLIETTA. Excuse me, sir. Would you hold that microphone closer.

Dr. DAVIES. Is that better, Mr. Chairman?

Mr. FOGLIETTA. Yes. It is.

Dr. DAVIES. Thank you. At EPA, we have been conducting a very vigorous effort to implement the provisions of the Ocean Dumping Ban Act, and we have been trying to keep both the Congress and the public very much informed about our activities through this period. We have conducted four public meetings, and we have had a series of congressional briefings to keep you gentlemen and ladies informed.

The testimony today will address the status of our efforts to finalize enforcement agreements and permits toward the elimination of ocean dumping of sludge. The testimony discusses land-based alternatives to ocean dumping; discusses our efforts to increase the level of monitoring at the 106-mile site; and on our Report to Congress that you requested on discharge criteria for section 403(c); and our discussions on the de-designation of the industrial waste site.

One of the perhaps controversial issues that you will be dealing with over the next two days is that the ban sets forth a stringent time frame to end the ocean dumping of all sludge.

It also prohibits dumping nine months after its passage, on August 14th, 19889, unless the dumpers have both a permit and a compliance, or an enforcement agreement which is signed by the dumpers, by the respective States, and by the EPA.

In December 1988, EPA and the States met with the nine remaining municipal ocean dumpers to explain the provisions of the Ban Act and our requirements, and to request that phase-out schedules be submitted by each of these people.

The dumpers submitted preliminary schedules in January of 1989, and EPA, in concert with the U.S. Department of Justice, the New Jersey Department of Environmental Protection, New York State Department of Environmental Conservation, initiated negotiations, and we have tried to work as a team in these negotiations.

Discussions have continued on the details of the interim and alternative, or long-term schedules, as well as the specific provisions and language of the enforcement agreements which were initially drafted by EPA, in cooperation with the Justice Department, has elected to enter these enforcement agreements as judicial consent decrees in order to ensure strict oversight and the enforcement of the phase-out schedules.

Negotiations are continuing with New York City, Westchester County, Nassau County, and we hope that agreement will be reached soon. However, the New Jersey dumpers refused to continue negotiations in late March and filed suit against EPA and the State of New Jersey on April 19, 1989, requesting judicial review of EPA's interpretation of the use of enforcement agreements instead of compliance agreements.

Although that suit was not settled, on May 12, we resumed negotiations with them on the phase-out schedule.

On March 24th, EPA announced its tentative decisions to issue ocean-dumping permits. Eight public hearing sessions were held at five locations, and the hearing officer report is due to Bill Muszynski, the Acting Regional Administrator, by June 15th, 1989.

This will be followed by a final determination by July 1989. Permits would become effective on or before August 14th, assuming no request for an adjudicatory hearing is filed, or, if one is filed, that it is denied.

The tentative permits have been developed to ensure compliance with the Ban Act and EPA's existing ocean dumping regulations.

The most significant conditions include: reducing the proposed discharge rates for sludge disposal from 15,500 gallons per minute to rates ranging from 8,719 to 145 gallons per minute, and this depends upon the toxicity of the sludge.

We have also required that a manifest system be imposed which requires oversight by EPA inspectors, and the use of EPA-supplied discharge valve seals and manifest forms.

Each sludge barge is required to have the Ocean Dumping Surveillance System, or the "black box" installed, and operational prior to departure for the Deepwater Municipal Sludge Dump Site, which we call the 106 site.

All 16 vessels authorized to use the site are equipped with black box units. I am sure the Coast Guard will talk about this activity in its testimony. An EPA-approved ship-rider is required to be provided by the sludge dumpers, and at their expense.

The permittees are required to assist EPA in implementing an extensive four-tiered monitoring plan, and in order to ensure proper separation between barges at the site, EPA has designated a discharge trackline pattern at the site.

In terms of the monitoring requirements, we have in existence a four-tier monitoring system which, at the first tier includes sludge characterization; the second tier near-field fate and short-term effects; the third tier, far-field fate; and at the fourth tier, long-term effects.

In the Ocean Dumping Ban Act, you required that EPA, in cooperation with NOAA and the Coast Guard, design a monitoring program for the Mid-Atlantic bight by November 1989, with some specific provisions on what the monitoring plan should contain.

We have held a workshop with the Federal agencies, and many people from the scientific and technical community, sewage authority, and some of your own staff participated in the workshop.

And the workshop confirmed additional needs and recommended strategies for conducting monitoring research and surveillance activity at the 106-mile site.

We had some agreement coming out of the workshop, which will lead us to a dumping strategy, and, finally, a full monitoring plan and a report to Congress by the end of this year.

The agreement that we reached was that, based on the toxicity of the sludge to marine organisms, dumping rates should be substantially reduced; that there is no evidence from existing studies that dumping of sewage sludge at the 106-mile site poses a threat to human health, either directly or indirectly through the consumption of seafood; that there is no information to suggest that seafood from the Mid-Atlantic bight is unsafe because of the dumping activities; and we have not found, with existing studies, measurable effect on living resources.

The recommendations from the workshop to Federal agencies were the following. We need to expand the existing monitoring efforts at the 106-mile site to include monitoring the movement of sludge away from the site, and the possible effects on fish and shellfish; that we need to increase the monitoring of the quality of fish and shellfish from the area, to ensure that the supply of seafood remains wholesome; that we should conduct additional research and monitoring on fish and shellfish that are outside the area of the site; and that we need additional physical oceanographic measurements to determine better the movement of sludge away from the site.

EPA is currently pursuing the de-designation of two ocean disposal sites—the Deepwater Industrial Waste Site located approximately 106 miles offshore of Cape May, New Jersey, and the Acid Waste Disposal Site located 15 miles offshore of Long Branch, New Jersey.

There are currently no permittees utilizing either site. Therefore, the need for the site is eliminated.

The Deepwater Industrial Site was last used in March 1987, and permit reapplications by the last two permittees were withdrawn due to the feasibility of land-based alternative disposal methods.

I think that at that point I will conclude my testimony, and we will welcome any questions.

[The statement of Mr. Muszynski can be found at end of hearing.]

Mr. FOGLIETTA. I thank you, sir. I would like to call upon Dr. Stanford at this time. If you want to submit, for the record, a prepared statement, and then briefly summarize that, you may do so, or you may read the entire statement. It is your choice.

STATEMENT OF DR. HAL STANFORD, DEPUTY DIRECTOR, MARINE ASSESSMENT DIVISION, NATIONAL OCEAN SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Dr. **Stanford**. Thank you. Mr. Chairman, and members of the subcommittees, Mr. Thomas Maginnis is unable to be here to present the NOAA testimony.

I am Hal Stanford, with NOAA's Office of Oceanography and Marine Assessment, and I will present the testimony for Mr. Maginnis. Thank you for the opportunity to discuss NOAA activities related to implementation of the Ocean Dumping Ban Act of 1988.

NOAA is working very closely with EPA and the Coast Guard in implementing Title I of the Act. It is a pleasure to report that the efforts of the three agencies have been very cooperative and effective.

The Act requires renewed attention by EPA, the Coast Guard, and NOAA to all ocean dumping activities in the Middle Atlantic Bight except disposal of dredged materials.

A series of actions has been initiated by the three agencies to ensure effective and coordinated implementation of the Act.

Our initial efforts are focused on sewage sludge dumping at the 106-mile site. Future efforts will address other ocean dumping in the Bight. NOAA, EPA, and the Coast Guard recently sponsored a joint workshop on sewage sludge dumping at the Middle Atlantic Bight 106-mile site. The workshop was held the end of March in Ocean City, New Jersey.

Attendees at the workshop included representatives from Federal and State agencies, the scientific and technical community, citizen groups, Congressional staff, and the sewerage authorities currently dumping at the 106-mile site.

The workshop addressed four major issues, and Dr. Davies addressed them earlier. They were: transport of sewage sludge from the site, and the fate of the sludge; effects on living marine resources; effects on human health; and changes in site management that would provide increased protection of human health, marine environmental quality, and living marine resources.

The workshop participants worked together to provide recommendations for strategies to resolve technical uncertainties and public perceptions that affect site management.

Using the workshop recommendations, EPA, the Coast Guard and NOAA are developing an overall strategy and a detailed implementation plan for further research, monitoring and surveillance related to sewage sludge dumping at the 106-mile site.

The joint strategy, already in draft form, is undergoing further development and refinement by the three agencies. That draft is being used to initiate development of the joint work plan. Elements of the work plan will be implemented by the agencies through their ongoing programs. The strategy and plan are focused on the same four major issues that were addressed in the workshop.

NOAA will implement its activities in the work plan with funds received from the ocean-dumping fees imposed under the Ocean

Dumping Ban Act. These new NOAA activities will complement other NOAA efforts that are underway, or planned, and build upon NOAA's already extensive and impressive accomplishments in ocean dumping research and monitoring.

Let me highlight some of NOAA's recent findings. Reference was made earlier to the deaths of unprecedented numbers of dolphins within sight of bathers along East Coast beaches from early June 1987 to March 1988.

That alarmed the general public and focused perceptions on waste disposal in the Middle Atlantic Bight. Though dumping at the 106-mile site cannot be linked directly to these mammal deaths. The site has become symbolic of all coastal pollution problems.

NOAA regularly conducts bottom trawl surveys in the Middle Atlantic Bight for fisheries assessment. Primary interests are the distribution and abundance of principal finish at or near the bottom.

NOAA scientists also record overt symptoms of fish diseases and other pathological indicators. Data from the most recent survey are available in a new NOAA report. Another recent NOAA report addresses disease in fish and shellfish in the Middle Atlantic Bight. While natural populations of shellfish, especially lobsters and certain crab species, have been reported with significant disease, there is no indication that specimens obtained from the general area of the 106-mile site have shown any unusual disease symptoms, either in kind or amount.

NOAA scientists have not, based on present information, attributed shellfish diseases directly to ocean dumping at the 106-mile site.

NOAA has been conducting a study of recovery of conditions at the 12-mile ocean dump site in the New York Bight. The degree and rate of recovery there have implications for dumping at the 106-mile site. NOAA recently published a second progress report on its site recovery study. Since 1987, when the reduction and cessation of sludge dumping at the 12-mile site occurred, the concentration of dissolved oxygen in bottom waters during summer months has increased considerably, and concentrations of contaminants, including toxic trace metals, have decreased.

In addition, seabed oxygen uptake rates have decreased to the point where they are now similar to rates measured in coastal areas that have not been influenced by sewage sludge dumping.

A pollution indicator species, the worm capitella, has declined in number in the vicinity of the 12-mile site, indicating a positive change in community organisms with the reduction of pollution inputs there.

In response to fiscal year 1989 congressional budget direction, NOAA has initiated some undersea vehicle research activities that are directly related to the 106-mile site and the surrounding region.

NOAA is analyzing results from samples taken during 16 submersible dives in the area from Block Island to the Hudson Canyon, and along the continental slope of the New York Bight. Biological and chemical analyses are underway. A full report should be ready by August of this year.

Additional dives are planned for this coming September at the 106-mile site. All of these studies will be conducted in the context of the strategy and plan for additional research, monitoring, and surveillance that are being prepared jointly by EPA, the Coast Guard and NOAA.

Mr. Chairman, this concludes the testimony. I will be happy to respond to questions.

[The statement of Mr. Maginnis can be found at end of hearing.]

Mr. **Foglietta**. I thank you, Doctor. Captain Folsom.

STATEMENT OF CAPTAIN DAVID L. FOLSOM, CHIEF, MARINE SAFETY DIVISION, DISTRICT I, UNITED STATES COAST GUARD

Captain **Folsom**. Than you very much, and good afternoon, Mr. Chairman. I am Captain David L. Folsom, Chief, Marine Safety Division, First Coast Guard District, representing the Commander, First Coast Guard District, Boston, Massachusetts.

I am pleased to meet with you to discuss the Coast Guard's responsibilities and role under the Ocean Dumping Ban Act of 1988 which amends Title I of the Marine Protection, Research, and Sanctuaries Act of 1972.

The U.S. Coast Guard is responsible for surveillance and enforcement of the Environmental Protection Agency's permitted ocean dumping program. As such, we are required to provide surveillance of sewage sludge dumping at the deep-water municipal sludge dump site, commonly referred to as the "106- mile dump site," which is located southeast of New York harbor.

In 1973, ocean sludge dumping surveillance methods entailed using Coast Guard personnel as shipriders. To reduce the need for these personnel resources, the Coast Guard's Office of Research and Development developed an Ocean Dumping Surveillance System, ODSS, that shows the date and exact time that a vessel is at a given position.

Three hull transducers have also been placed on each vessel. These transducers are pressure sensors which detect changes in a vessel's draft and are coupled with the electronic package which is then capable of determining that the vessel is dumping.

This information is transmitted by FM radio to a base station at the Coast Guard captain of the port office on Governors Island, New York. When a vessel is out of direct communications range, the data are recorded and stored in the memory of the vessel's "black box" computer. When radio communication is reestablished as the barge gets closer to home, the information is transmitted from the "black box" through the relay station back to Governors Island.

All 16 vessels authorized by EPA to dump sludge at the 106-mile site have the Ocean Dumping Surveillance System installed. Since implementing the system in July 1988, we have experienced some equipment problems; however, our ability to collect data during a vessel's entire transit has steadily improved.

The hard copy printout data obtained from the system is sent to the EPA Region II office in New York for their review and appropriate action in pursuing any violations that may be indicated.

The Coast Guard will continue its surveillance of the 106-mile dump site until all municipalities now using the site come into compliance with the Ocean Dumping Ban Act, and cease ocean dumping of sludge material. We will continue to work closely with the EPA on this matter.

I will be happy to respond to your questions.

Mr. FOGLIETTA. I thank you, Captain. Dr. Davies, have there been sufficient advances in the art of air-pollution control to make sludge incineration environmentally sound?

Mr. KISELICA. Mr. Chairman, my name is Bruce Kiselica from EPA Region II. In answer to your question, yes, we believe there has been significant advancements to address air-quality impact concerns. More specifically, or because of some of the proposals for incinerators that has been laid out, EPA, in cooperation with the States of New York and New Jersey, will be conducting a regional air-impact assessment study, to look at both the existing incinerators as well as proposed sludge incinerators, and other municipal solid-waste incinerators, to answer the question of potential cumulative impacts within the metropolitan area.

Mr. FOGLIETTA. Do you think it is possible to have the agreements under the Act in place, and permits issued by August 14th, 1989, the statutory deadline under the Act? If not, what will EPA's position be on continued dumping at the site—the 106-mile site?

Mr. KISELICA. Yes, we believe it is possible to have both the agreements and permits in place. Our initial schedules that were developed when the Ocean Dumping Ban Act, shortly after the Ocean Dumping Ban Act was passed, we recognized that we would be all working under tight time frames during this 9-month period. The schedules we have laid out—and for the most part, we are on target. We are, frankly, running a little behind at this point on coming to agreement on the agreements, but, yes, sufficient time does remain in order for both processes to conclude.

As was mentioned earlier, the current schedule, now, for the permits, calls for the hearing officer's report to be submitted June 15th, and final recommendation on the issuance of the permit by the regional administrator on July 15th, thereafter allowing for a final public comment period before the permit becomes effective.

In terms of the agreements, and what happens if we do not have agreements, and what is EPA's position—I think the Ban Act makes it clear that since dumping would be illegal without either one—and one needs both—that if we do not have agreements we cannot issue the permits. If the permits are not effective we have no agreements, and any dumping after that date would clearly be considered illegal, and we would have to take appropriate enforcement action.

Mr. FOGLIETTA. Is EPA intending to, or giving consideration to participating in an expedited joint resolution through the courts, regarding a form of agreement for the New Jersey dumpers?

Mr. KISELICA. That is, in part, asking a response on the law suit filed by the New Jersey dumpers, and I guess at this point it may not be appropriate for EPA to comment on our exact position and response to the law suit until that actually comes out and is more fully developed.

Mr. **Foglietta.** Do you know whether the New Jersey dumpers have reached any agreements with the out-of-State landfills, particularly those in Pennsylvania, for the disposal of the sludge, and what is EPA's view of such agreements as alternatives to ocean dumping?

Mr. **Kiselica.** The key milestone is actually laid out in the Ocean Dumping Ban Act.

Mr. **Foglietta.** I am sorry? The key——

Mr. **Kiselica.** The key milestones that were laid out in the Ocean Dumping Ban Act, number one, started our framework for development of the schedules. As part of the development of the schedules, and clearly, looking for the need for interim solutions to meet the 1991 deadlines, the dumpers were faced with, obviously, tough alternatives in order to respond to EPA's request for the schedules.

As it stands right now, some of the additional key milestones that we have put in are not only to obtain contractual arrangements for a land-based alternative, even in the interim, but as well as some sort of contingency plan or ability to demonstrate a alternative plan, if the first one, frankly, falls apart.

The schedules for obtaining those are future dates, and, for the most part is not something that I think the authorities have right in hand, although I do know for a few, they have been exploring with various landfills in Pennsylvania, the available capacity, which we also believe does exist.

Mr. **Foglietta.** I thank you. Sorry. Will you continue——

Mr. **Kiselica.** I guess the last point was what is our comment or do we accept the landfilling as an alternative.

To the extent that it can happen and meets the permitting criteria of whatever host State that is, we would consider that an acceptable alternative. Clearly that is not—you know—the number one hierarchy of preferred alternative, but certainly as an interim alternative is something that is being proposed to us. I mean, we have not dictated, or specified exactly what interim measure must be implemented.

Mr. **Foglietta.** I thank you. Miss Schneider.

Miss **Schneider.** Thank you, Mr. Chairman.

I would like to pick up where the Chairman left off, and, your comment, that you have not dictated what technology ought to be used. Clearly, I, for one, do not happen to think that that is EPA's responsibility; that EPA ought to provide some breadth of opportunity because there are a whole series of different technologies that can be used to treat the sludge.

And so I think that those municipalities ought to have that freedom of choice. At the same time however—because I am going to direct my question to you, Mr. Kiselica—at the same time, I am suggesting that there ought to be freedom of choice on the variety of different technological options, I am also wondering to what degree does EPA have the capability of transferring information about the technologies that are available, and to what degree are you actually in the process of doing that to the remaining nine municipalities?

Mr. **Kiselica.** The agency has historically conducted a pretty well extensive technology transfer program in terms of new and emerging technologies, especially under the Clean Water Act, on the innovative/alternative program. Information, dissemination was the key, and I think it has worked throughout the construction grants program.

That includes technologies not only for waste water treatment but also for sludge disposal as well. Again, let me maybe clarify on the issue of alternatives, the responsibility, clearly, to identify and select the alternative under the Clean Water Act is the municipal authority's. However, EPA's policy certainly is to encourage the beneficial re-use and re-cycling of sludge wherever it can be done, and that is again, further demonstrated through the various efforts of technology transfer.

Miss **Schneider**. Right. Well, the reason I am asking the question, which is somewhat of a leading question—is one of the concerns that I hear most frequently, because I also serve on the Science and Technology Committee, is that many municipalities, many representatives from the private sector, are having a difficult time complying with various EPA regulations only because they are not aware of the technologies that do exist.

And I am just wondering if there is an assessment on the part of EPA as to how to address that problem. I perceive it as a very significant problem. I think that we are dragging our feet in problem-solving, and it could be speeded up if we had a better information flow about the technologies.

But let me shift, because I have a limited amount of time. I wanted to get a few more questions on the record.

Dr. Davies, you were mentioning earlier in your testimony about the EPA intending to increase the monitoring of shellfish and, in addition to that, increasing the monitoring of the movement of sludge.

Once again, I will say that it has probably been about 18 years, now, that I personally have heard about the need for monitoring, not only in our own Narragansett Bay in Rhode Island, but throughout the United States.

And I think that one of the most frustrating things is that because of the budget, we have not appeared to have an ongoing monitoring system that can be relied upon to provide us with enough scientific data on which we can base policy.

Now, how well is EPA equipped, right now, to do the kind of monitoring that you say you are going to do?

Dr. **Davies**. The monitoring plan for the 106-mile site, we have an existing plan. As you say, it is somewhat limited by the budget that we have. We have been moving through a tiered system. The way that we run monitoring is that we use a contractor, or, we use scientific institutions to work with us on this.

I think given that you have, we think, thoughtfully allowed the fees from ocean dumping to return to the agencies, we will be able to supplement on ongoing monitoring activities, and we think almost pay for the proposed plan that we will have in effect this fall.

Miss **Schneider**. Good.

Dr. **Davies**. Let me add that Mr. Bill Muszynski has arrived, he is sitting at the end of the table, and he is the Acting Regional Administrator for Region II, and he and Bruce have been very actively involved in the discussions with the municipalities.

Miss SCHNEIDER. Right.

Mr. MUSZYNSKI. Sorry I am late.

Miss SCHNEIDER. I think you may need to use the microphone.

Mr. MUSZYNSKI. I apologize for being late, but I think I am living proof that the drought is finally over in our area.

Miss SCHNEIDER. Did you have anything to add to Dr. Davies' response?

Mr. MUSZYNSKI. No.

Miss SCHNEIDER. I would like to address my final question to Captain Folsom, and, at the same time, take the opportunity to publicly thank you for staying on top of our inquiries in so far as Montauk and Block Island Sound are concerned. I am getting very positive feedback that we are moving toward solving a problem there.

But I would like to ask you, also along the lines of monitoring, how effective you find the "black boxes" and some of EPA's new requirement for seals, and stopping short dumping?

Captain FOLSOM. The Coast Guard has not been involved in the seal program. They instituted the seal program—I think initially, we provided them with some Coast Guard seals that we already had to get them through, until they could get their own order of seals.

Our activity, again, has pretty much been with the ODSS, and since March, we have been operating anywhere from a low of 30 percent of good runs all the way up to 82 percent. So, on the average, we are now somewhere around 60 percent.

So, 60 percent of the runs, we get good feedback from the "black box." Now, again, some weeks it is lower. That tends to be the vessels. We have some of the vessels that have transducers, that are not operating, so we do not get the draft information back.

Now we are not going to be able to repair those transducers until we reach a point where the barge operator is going to put the vessel up on the drydock so that we can get at the transducers, to replace them.

So one of the problems we are always going to have with a draft-reading system, is if we lose the transducer, is having to wait until we can get the vessel up on the drydock to make those replacements.

Miss SCHNEIDER. Well, is any short dumping still going on?

Captain FOLSOM. In the 2 years I have been involved with the ocean dumping program after the First Coast Guard District took over the New York and northern New Jersey area as part of the First District, I have received no reports, either from Coast Guard units, or from private parties, or other Government entities, of any short-dumping activity. No specific allegation that we could go out an investigate.

Miss SCHNEIDER. Or from fishermen?

Captain FOLSOM. We have had allegations from fishermen. They say "short dumping" but then they are never able to identify the specific incident, or who it might be, so that we can do any sort of follow-up activity.

Miss SCHNEIDER. Okay. Great. Thank you very much, Captain. Thank you, Mr. Chairman.

Mr. FOGLIETTA. I thank the gentlelady. Mr. Hughes.

Mr. HUGHES. Thank you, Mr. Chairman. I have an opening statement I would like to put in the record, Mr. Chairman.

Mr. FOGLIETTA. Fine. Without objection.

[The statement of Mr. Hughes follows:]

STATEMENT OF HON. WILLIAM J. HUGHES, A U.S. REPRESENTATIVE FROM NEW JERSEY

I want to thank the Chairman for holding today's hearing on the implementation of the Ocean Dumping Ban Act of 1988.

As the Memorial Day Weekend approaches, beginning the summer season in New Jersey, millions of Americans are looking forward to white sands, clean ocean waters, and fresh seafood caught off the Jersey shore.

But, much of the excitement that usually accompanies the change of seasons is tempered these days by an underlying feeling of apprehension. The memories of last year's headlines about ocean pollution are still fresh in many people's minds. While our beaches were clean in southern New Jersey, the adverse publicity suffered by communities in North Jersey, New York, and elsewhere along the East Coast affected us as well.

As people begin now to plan their summer vacations, they remain concerned about the quality of the ocean. They want to know what the Government has done to ensure that the ocean is safe to swim in, and that seafood will be safe to eat.

As you know, we have done a lot. In fact, I do not recall a more productive session ever than the 100th Congress in terms of passing legislation to protect the ocean and coastal environment. Today's hearing will focus on the implementation of one of our achievements—the Ocean Dumping Ban Act, which was signed into law on November 18, 1988.

Mr. Chairman, I am very proud to have been one of the authors of that law, along with Congressman Jim Saxton, and other Members of this Committee. It took a major legislative effort to enact this law, and now it is up to the Administration to commit itself to full implementation and vigorous enforcement.

So far, the agencies have been doing a laudable job in carrying out their responsibilities pursuant to this law. Since the enactment of this act, EPA has shown its seriousness in bringing an end to ocean dumping once and for all.

I understand that the New Jersey dumpers have broken off negotiations with EPA and have filed a lawsuit seeking a ruling that they are entitled to enter into a compliance agreement. Although I am skeptical about the New Jersey sewerage authorities depending on out-of-state landfills as a valid interim measure, Congress did intend to allow the use of realistic and environmentally sound interim measures so that dumpers would end their ocean dumping practices as soon as possible.

Furthermore, by requiring the state of New Jersey and the state of New York to be parties to the compliance and enforcement agreements, Congress intended that the states actively participate in the negotiations and assist the municipalities in the development and implementation of alternative systems that are environmentally acceptable. Additionally, the state should promote alternatives that consist of beneficial reuse of the sludge.

Finally, I would like to inform the committee of legislation, which Congressman Saxton and Congressman Pallone have joined me in introducing, to make illegal dumping or transporting for the purposes of dumping a Federal criminal offense.

This legislation provides for substantial prison sentences and fines for persons who knowingly set out to violate the law. In addition, the bill authorizes the Federal Government to seize vessels or other property used by the dumpers in their illegal activities. This legislation will further strengthen the Ocean Dumping Ban Act and provide a stronger deterrent against those who illegally dispose of waste materials in the ocean.

Thank you, Mr. Chairman, I am looking forward to hearing from today's witnesses.

Mr. HUGHES. Thank you very much. I, too, want to welcome the panel, and while Bill Muszynski gets his breath, maybe I can ask Tudor Davies a couple questions, as well as Dr. Stanford.

Mr. Davies, first of all, the intent, really, of legislation was to stop ocean dumping, and to force municipalities to develop land-based alternatives. So far, is it working?

Dr. DAVIES. I think so. I think we have all the industrial dumpers out of the ocean at this point in time, which I think is a major step, and I think that everyone is negotiating in good faith to conclude ocean dumping of sewage sludge.

Mr. HUGHES. Is it possible to enter into a compliance agreement and yet not have a plan for long-term disposal of the sludge?

Dr. DAVIES. I think I will pass that to Bill Muszynski, if you do not mind.

Mr. MUSZYNSKI. No, it is actually not possible to enter into any agreement, be it compliance or enforcement, without having a long-term alternative.

Mr. HUGHES. So the net result is, if in fact these dumpers do not come up and negotiate in good faith, and develop land-based alternatives that seem to get them out of the ocean, as of August 14th they will not have any permits to dump?

Mr. MUSZYNSKI. That is correct.

Mr. HUGHES. So they cannot dump after that.

Mr. MUSZYNSKI. They need both the agreement signed by the three parties——

Mr. HUGHES. And they have to have a permit.

Mr. MUSZYNSKI. ——as well as the permit, and they cannot get the permit without the agreement. So that they have got a problem if they do not meet those two requirements.

Mr. HUGHES. Is it realistic to believe that New Jersey can indefinitely transport their sewage sludge to Pennsylvania, or Ohio. Is that a realistic, long-term solution?

Mr. MUSZYNSKI. I personally do not believe so, and that is one of the reasons why the stress is on developing the alternative systems so that you do not have to depend on, in a sense, out-of-State systems that merely transfer the sludge to another area.

We are looking at working with them to get those alternative systems and schedules in place as soon as possible.

Mr. HUGHES. Will you have a compliance agreement, or an enforcement agreement in place vis-a-vis New York City, in your judgment?

Mr. MUSZYNSKI. I use the words "cautiously optimistic" on that. I think the last set of negotiations that we had with them Thursday, last week, we indicated we were very close to having an enforcement agreement with them.

Mr. HUGHES. They talked in terms, at one time, of an outside date of 1998 as being the soonest that they can get out of the ocean. Do you see any movement towards interim solutions that would get them out of the ocean in 1991?

Mr. MUSZYNSKI. Yes. We do. We see it with all of the dumpers, for that matter, but specifically in New York City's case.

Mr. HUGHES. That is encouraging. EPA, how are you going to continue to in fact implement this Act if you do not have resources? And, as I see it, you did not seek any monies for fiscal year 1990, and according to my calculations, you are going to be $1.5 million or thereabout short. Tudor?

Dr. DAVIES. I think my calculations agree with yours.

Mr. HUGHES. Pardon me?

Dr. DAVIES. My calculations agree with yours.

Mr. HUGHES. So what are we going to do about it, since our arithmetic is correct?

Dr. DAVIES. I think one solution perhaps is to increase the fees.

Mr. HUGHES. Increase the fees? You mean a legislative solution?

Mr. HUGHES. Yes.

Mr. HUGHES. Well, all we need is some monies for start-up, and I am not so sure that that is within the realm of probability. Mr. Saxton and myself were in and testified before the Appropriations Committee seeking additional money for you, but wouldn't it make sense for EPA to support that, as at least a short-term solution?

Dr. DAVIES. Well, EPA goes through a budget process, and in the budget process we looked at the required amount of money, and we have a series of priorities to make and this one I guess was a priority that did not get within the ceiling that the agency went forward with.

Mr. HUGHES. Well, it seems to me, after 1990, we will have sufficient monies from permit fees for fees and penalties coming to EPA to carry the day. They will be sufficient to operate the program. So we are talking about a one-year hiatus?

Dr. DAVIES. Probably, yes.

Mr. HUGHES. Dr. Stanford, did I understand you to say that there is no evidence to suggest that any of the problems with mammals—I suspect you are talking about the dolphins—cannot be tied to the dumping at the 106-mile site?

Dr. STANFORD. From the evidence that we have right now, that is correct.

Mr. HUGHES. Which is not very much evidence, is it?

Dr. STANFORD. It is limited.

Mr. HUGHES. Yes. Well, the fact of the matter is we do not really know. I mean, we have no idea, because we really have not done the studies to make a determination as to whether or not the dumping at the 106-mile site is at the root cause of some of our problems in the ocean. Isn't that so?

Dr. STANFORD. There are a number of other studies that could be undertaken that would give us better information than we have at the present time. And, in fact, some of those are being addressed in the work plan that NOAA, EPA, and the Coast Guard are developing.

Mr. HUGHES. Well, I think it is almost criminal, that we do not have sufficient baseline studies to make decisions as policy-makers, and we have talked about doing some research, and, as I understand it, the NURP—the National Undersea Research Program—is a program that is endeavoring to get more information about the impacts at the 106-mile site. But I understand that NOAA has proposed to re-program some of that money.

So, how in the world are we going to be able to find out what is happening on the deep seabed if we gut the program?

Dr. STANFORD. I think NOAA will be able to undertake a great deal of study in this area, starting in fiscal year 1990, when the fees become available.

Mr. HUGHES. Yes, but the problem is now, Doctor. We cannot study the problem at the 106-mile site from Washington. We need to go out there, and try to develop some baseline studies, and see what impacts dumping at the 106-mile site has upon the deep seabed. We do not need to do that 2 years from now. We need to have done it yesterday.

And that was the mandate, as I understood it, several years ago, when we asked NOAA—that is NOAA's charge, and NOAA has failed to do that. I just think that is really unacceptable, if not unforgivable.

Dr. **Stanford**. Sir, while NOAA has the charge, the Congress did reprogram the monies that were directed earlier to ocean-dumping studies. They directed them to other NOAA activities.

Mr. **Hughes**. Now the reprogramming request came from NOAA; it did not come from the Congress. The Congress is opposed to the proposed reprogramming. It is NOAA that wants to reprogram. And are there programs more important than trying to find out whether dumping in the ocean is having a negative impact upon sea life?

Are fish, fish that we eat, and the dolphins that swim off our coast—is there anything more important, right now, in research than attempting to deal with that issue?

Dr. **Stanford**. Sir, these all deserve a great deal of attention. I cannot address, in any more depth, the NOAA matter with regard to monetary resources.

Mr. **Hughes**. Well, who can address that? I thought that it was something you could address today. Where can we get some straight answers from people as to what is more important at this point, than trying to find out whether or not the stuff that we are dumping in the ocean is contaminating our fish?

Dr. **Stanford**. We have no evidence at the present time that indicates they are being contaminated; and, we have ongoing efforts.

Mr. **Hughes**. Well, I will tell you: If we do not look at it, if we do not try to get any data, then obviously there is no data. If we do not look for any, then obviously the answer is going to be it is not having any impact. So if we sit here in Washington with blinders on, and not try to make a determination as to what is happening in the ocean, we will find that there is no evidence that ocean dumping is contaminating seafood.

Dr. **Stanford**. We do examine the pollutant levels in market seafoods, and there is no evidence of any such problem.

Mr. **Hughes**. Well, I heard testimony here within the past couple weeks, that most of the dolphin we looked at had high concentrations of PCBs, of DDT and DDE, and God only knows what else because we did not test for anything else. If we had tested for cadmium, mercury, chromium, hard metals, we would have probably found them, too, in the dolphins.

You know, I find it interesting. I am not a scientist, but I think common sense dictates, that, frankly, the only way we are going to find out is by beginning to monitor tests, develop some baseline data, and attempt to find out just what is happening at the 106-mile site.

Dr. **Stanford**. You have the same contaminants in sewage sludge as you have in the near-shore areas. It is extremely difficult to try to determine how much pollution an organism might have obtained from being in the near-shore area or being in some other area.

Mr. **Hughes**. But the testimony, doctor—and I was here for the testimony—the testimony was that the scientists have never found such levels of contamination in the dolphin. And the testimony was that we really did not test for any other contaminants except for PCB, as I recall, and DDT and DDE.

Was that the testimony, Mr. Chairman?

Mr. FOGLIETTA. Yes.

Mr. HUGHES. And it was astronomically high levels of contamination, and Dr. Geraci concluded that the cause of the death of those mammals was because of an algae bloom, natural causes. That is like the guy that gets shot in the stomach dies from bleeding to death, not the shot to the stomach, I suppose.

But, we just do not know, and we cannot sit here and suggest that there is no evidence. The dumping that we are doing at the 106-mile site is not creating problems, when we are not testing for it adequately.

Well, I know my time is up, Mr. Chairman, but I just hope that NOAA will take another look at that undersea research program. It is the only game in town, at this point, and it is important for that to continue. I thank you.

Mr. FOGLIETTA. I thank the gentleman. I would like to remind the members of the committee that we are operating under a five-minute rule, and that it will be enforced from henceforth, and not only that; but we will have a second round of questions if anyone wants to wait around to ask the questions that they did not get in in the first five minutes. Mr. Saxton.

Mr. SAXTON. Thank you, Mr. Chairman.

If I may just follow up on Mr. Hughes' line of questioning somewhat, and indicate to you that we know there are a couple types of tests that might be done. Mr. Davies alluded to one type of standard that we use for testing, and that is the effect of toxics on human beings. And I know that there is a great deal of concern about that.

But there is also another standard that we use in testing for pollutants with regard to pollutants' effects on the environment generally, whether or not it is healthful to the environment generally.

When we look at sludge that is dumped off shore, I do not think there is anyone in this room who would draw the conclusion, given the opportunity, that dumping sludge in the ocean is healthful to the ocean, or even that it is neutral. It has to be a degratory type of result that comes from that.

Let me just tell you a story about what happens to us. Mr. Hughes and I represent what might be considered the southern part of New Jersey, along the shore, and I guess about 2 years ago, a television actor by the name of Ted Danson came into my office, and he asked me to join the American Ocean Campaign. And I did that. I thought it was a worthwhile group, and I agree with most of their objectives.

He said if I can ever do anything for you, please call me. So I called him last week, and I said, you know, we are starting a new season at the New Jersey shore, and people are starting not to want to buy the fish that we catch in Cape May, and out of Barnegat Light, and those places.

And I said, won't you come to New Jersey and get on a boat with me, and we will go out in the ocean and we will catch some fish. We will bring them back to a restaurant and eat them, publicly to demonstrate there is nothing wrong with the fish that are caught on the New Jersey shore.

Mr. Chairman, I got back to my office this morning, and I found this article on my desk. "The State of New Jersey yesterday modified a 6-year-old advisory about consuming bluefish, one of New Jersey's most popular recreational and commercial fish, extending the caution to the entire coastline, not just those fish caught north of Barnegat Inlet. The Department of Environmental Protection Commissioner Christopher Daggett said that the State decided to refine its advisory about bluefish contaminated with polychloride, PCBs, based on six additional years of State and Federal research."

"We know that because the bluefish migrate up and down the Atlantic coast, there is no reason to restrict an advisory to a specific area. Recent sampling also shows similar levels of PCBs in bluefish caught in the southern part of the New Jersey coast."

Now when I look at that, and hear that the State says we cannot eat bluefish because they are contaminated with PCBs, and when I look at the results of the studies that have been done by the Environmental Protection Agency, basically studying the sludge—not so much in the water, but studying the sludge—you find a list of materials that are contained in the sludge which include iron, zinc, chromium, copper, lead, nickel, cadmium, arsenic, mercury, and PCBs.

And when we hear, one, that there is no evidence that this is harmful to humans, and then newspapers are telling us we cannot eat bluefish, and, secondly, we appear to hear that we are not—we, the Federal Government—are not testing for these types of substances that might emanate from dumping sludge, it leaves me confused. I do not understand. I did not even ask a question yet, Mr. Chairman.

[Laughter.]

Mr. FOGLIETTA. I was going to ask you to get to your question before your five minutes are up. It was an excellent statement.

[Laughter.]

Mr. SAXTON. I guess the question is, is it our responsibility to direct the scientists as to what types of tests they ought to do, or is that EPA's—don't we need to get to the point where we are testing, to see whether or not—we assume that it has to have some impact—whether or not sludge dumping is harmful with regard to the subject of the newspaper article, and these other substances which we know are in the ocean?

Dr. DAVIES. I am sure I am going to stick my foot in my mouth at this point. In my mind, sludge dumping is one source of pollutant input to the Mid-Atlantic bight. There are multiple sources, land-based discharges. We have air impacts, precipitation, and we have sludge dumping.

We find it very difficult to attribute the bioconcentration in dolphins, for instance, to a specific source of pollutants, and I think the workshop that we had looked at the direct impact of sludge contaminants on the biota, trying to separate those from other sources of contaminants, and we were unable to find evidence that we had concentrations in the water that could be bioconcentrated outside the dump site.

I am not saying that the concentrations are not there. I am not saying we do not have a problem with toxic contamination in the Mid-Atlantic bight, but we must consider this as one source, and we must also think of it in a regulatory sense with the other multiple sources.

I feel that EPA has directed its activities to trying to get ocean dumping to cease, with the resources that we have available, that we have followed a very appropriate monitoring system to try to define the pathways and fate of pollutants, and to reduce the pollutants as far as we can in the sludge we dump.

Mr. **MUSZYNSKI.** I agree with Tudor, and I think the fact that the recent Ocean Dumping Ban Act now gives us the obvious direct authority now to end that, without getting into the debate, in essence, of what the contribution is or is not, which the prior Act did not. In a sense shifts the burden of proof, in other words. That there is no reason to debate the cost of getting out; there is no reason to debate, or to prove beyond a reasonable shadow of a doubt environmental effects of ocean versus land.

That we are pursuing to end that dumping as soon as reasonably possible.

Mr. **SAXTON.** My concern over the testing, Mr. Chairman—new Mr. Chairman. Does my time start over?

[Laughter.]

Mr. **CARPER.** [presiding.] You have a new lease on life.

Mr. **SAXTON.** My concern is that in 1981, when the courts ruled that ocean dumping in effect could continue, one of the sets of facts that the courts based their decision on was that we did not have evidence to prove that dumping sludge in the ocean was harmful, and we still do not. And we still have not tested, as far as I can see, to gather the type of information that might be necessary, should that set of circumstances, in a court of law occur again. Is that true?

Dr. **DAVIES.** I think in the 1981 decision we were able to show that the 12-mile site at which dumping was occurring was degraded, and we closed that site, and went to a more dispersive site which is the 106 site. So there was evidence, I think quite categorical evidence, that degradation at the site was a consequence of sludge dumping.

Mr. **SAXTON.** Thank you.

Dr. **DAVIES.** I think also that decision looked into the balancing. It did take into account costs. It did take into account balancing of land versus ocean effects, in a sense.

Mr. **SAXTON.** I know my time is almost up. Let me just move to one more subject, very quickly. Dr. Stanford, we know now that there are something called "warm core rings" that the Gulf Stream produces, and that they move oftentimes from east to west in an on-shore direction.

And we also know that they go through the 106-mile site. I believe, from the technology that we have available, that it is possible for us to predict, quite accurately, when those warm core rings may pass through the 106-mile site. Do we have any plans, either in terms of NOAA, or through EPA, to alter the sludge-dumping schedule to coincide with times when those warm core rings are not moving through the 106-mile site toward shore?

Dr. **Stanford**. I am not aware of any shift in schedule, but I think Dr. Davies can address that. There have been some recommendations in that direction, and in fact that matter was raised at the recent workshop—once again, as a possible way of inserting more care in the ocean-dumping process.

Dr. **Davies**. In the proposed permits we do not intend to restrict the use of the site during periods of warm core ring passage, but it is something that I think could be modified, in time, as we develop a monitoring program.

Mr. **Saxton**. Well, again, from a non-scientific layman's point of view, it would make eminent sense, if we are going to continue for some period of time to use the 106-mile site, to discontinue using it when it is shown, scientifically, through the technology that NOAA has available to us, that there are on-shore currents at work.

Thank you, Mr. Chairman.

Mr. **Carper**. You are welcome. Dr. Stanford, let me come back to you, if I can. A question, again, on water quality, and I think you, or one of the panelists has addressed this but let me just make sure I understand.

When did we stop dumping at the 12-mile site?

Dr. **Stanford**. Pardon?

Mr. **Carper**. When did we actually stop dumping at the 12-mile site?

Dr. **Stanford**. I believe dumping ceased there the 31st of December 1987.

Mr. **Carper**. All right. And when did we start dumping at the 106-mile site?

Dr. **Stanford**. That was earlier in the year for the dumping of sewage sludge.

Mr. **Muszynski**. March 17th.

Mr. **Carper**. Okay. That is fine. What could you say about water quality at the 12-mile site in terms of improvement, or lack thereof? What can you say about water quality at the 106-mile site in terms of water quality, or lack thereof?

Dr. **Stanford**. With regard to the quality of the environment at the 12-mile site, we have found that the dissolved oxygen conditions in summer used to be as low as a half a milligram per liter. Now we are finding that, commonly, measurements are of the order of maybe 4 milligrams per liter.

We are also finding that the——

Mr. **Carper**. And what does that mean? Is that good?

Dr. **Stanford**. That means it is better.

Mr. **Carper**. Yes. It sounds better.

Dr. **Stanford**. That means that there is more oxygen available.

Mr. **Carper**. Is it a lot better? It sounds a lot better. I do not know if it is, or not.

Dr. **Stanford**. A hell of a lot better, I think.

Mr. **Carper**. Thank you.

Dr. **Stanford**. We find that the bottom conditions, at least, are represented by the demand for oxygen—you have organic materials down there that demand oxygen. The oxygen demand is far less, and in fact it is much more akin to what we find in other areas that have not been impacted by sewage sludge dumping.

There are also certain indicator species that suggest that things are getting better at that particular site.

Mr. CARPER. How about the 106-mile site?

Dr. STANFORD. Most of the measurements of water quality that have been made, as of late, at the 106-mile site, was by EPA in conjunction with their tiered monitoring approach.

Mr. CARPER. Mr. Davies, do you have anything you would like to contribute on that point?

Dr. DAVIES. Yes. As you know, the 106 site is a very deep-water site, and we have been looking particularly at surface waters in terms of whether water-quality criteria, concentrations, are impacted by the dumping of sludge, and we have found one or two occasions when this is so, and this is the reason why the proposed permits have very specific limitations on the rate of discharge of materials. We have not, however, found that—or we have not looked, frankly, at the sea floor, to see if there are significant accumulations of material, and that is one of the recommendations of the monitoring program, that we should do that.

Mr. CARPER. You say you have not been looking at the sea floor?

Dr. DAVIES. The sea floor is——

Mr. MUSZYNSKI. Two to 3000 meters.

Dr. DAVIES. Yes, about 3000 meters deep there, and the technology is quite difficult, to collect sediment there. We have been following the dispersion of the plumes from the barges in the surface waters, and we find that after a relatively short period of time, that we are unable to track even the sludge plumes further in the surface waters.

Mr. CARPER. Sort of a related question, if I could. Do you know whether the dumpers can meet the proposed discharge rates in the draft permits, given the current barge capacities?

Mr. MUSZYNSKI. It is our opinion that they can do that. They have challenged that position in part of their comments to our permits and we are——

Mr. CARPER. I am sorry. Say that again, please.

Mr. MUSZYNSKI. It is our position that they can meet them; otherwise, we would not have put them in the proposed permits. They have challenged that position in their comments to us on the proposed permits and we are reviewing their comments right now.

Mr. CARPER. If the dumpers follow these rates, can we be reasonably sure that dumping at the 106-mile site will not have any significant adverse environmental impacts?

Mr. MUSZYNSKI. That is our determination; yes.

Mr. CARPER. Let me go back to our captain, Captain Folsom. I think in response to a question posed by Miss Schneider, I think I heard you say that roughly 60 percent of the dumping missions to the 106-mile site, that we are gathering computer data on the location of the dumps and on the discharge rates for 60 percent of them? Is that what you said?

Captain FOLSOM. That is correct.

Mr. CARPER. And so how long have we been doing this now?

Captain FOLSOM. This is information that we have collected since March, because in the end of January, first part of February, we had a failure of the base station when we lost all of the software data. It took us some time to rebuild and get the base station back on line. Since that time we have been collecting weekly information, doing an analysis to find out how many runs we had in the week and how many were good runs. So we have weekly statistics for what the percentage of good runs are.

We may have gotten data, some data from a barge, but we did not get the complete data for the entire run. So we do not consider it to be a good run.

Mr. Carper. Last year, when dumping of sewage sludge at the 106-mile site began in earnest, fewer than half of the, or maybe fewer than a third of the actual sorties were recorded?

Captain Folsom. We received good data, yes, on about 60 percent. Before the turn of the year, we were down. We started down around 20 or 25 percent, and we have been working our way up——

Mr. Carper. So last year maybe a quarter? We had data on maybe a quarter of the sorties?

Captain Folsom. Yes.

Mr. Carper. Now we are up to 60 percent?

Captain Folsom. Yes.

Mr. Carper. What is a reasonable goal?

Captain Folsom. We have got a goal of 80 percent. We hope that we will be able to get 80 percent.

Mr. Carper. By what date?

Captain Folsom. I have no idea at this time. One of our problems right now is having to replace some of the transducers that measure the draft on some of the barges. They failed, so we are not getting any draft data. So therefore, when they do the run, we can collection position information and we can provide the track-line information of where the barge went and where it was at any particular time, but we do not know when they started dumping.

From the black box, we cannot tell when they started to dump the material, or when they stopped dumping the material.

Mr. Carper. Do I understand you to say there is a rider, there is somebody on each vessel to observe?

Captain Folsom. I will defer that to EPA.

Mr. Muszynski. We have already required the companies to give us track lines that they certify are correct. They do not know, for instance, which of the black box units are working, and when. We are the only ones that know that.

But in addition, as part of our proposed permits, we have required that shipriders be present on every vessel.

Mr. Carper. Do we have reason to believe that last year when we had no computer data on 75 percent of the vessels, and this year we have, at least at this time, no data on about 40 percent—can we be assured that the barges are dumping where they are supposed to be?

Mr. Muszynski. Based upon the correlation that we have done between the data that they have given us, and the runs that were working, we did find good correlation. So from that, you know, it is our prediction that there is reasonable correlation, that they are dumping at the site.

There is nothing to be gained, in essence, for them to be traveling out to the 106-mile site and somewhere along the line short dumping. So that if we do know—and in fact the positioning of where the vessel is is probably more accurate than the 60 percent and the 25 percent figures that have been mentioned here today.

Mr. CARPER. All right. Mr. Lent, do you have a few questions?

Mr. LENT. Yes. Thank you very much, Mr. Chairman. I do not happen to be a member of this subcommittee, although I am a member of the full committee. I am down here because I have a witness who will testify later, Mr. Steven Fangmann, who is the Deputy Commissioner of Public Works of Nassau County, New York. I represent a portion of that county which has a population of 1.3 million people, and in his testimony, Mr. Fangmann brings up a couple of points.

I was a co-sponsor of this ocean-dumping bill, and I checked with my county before I worked on the bill and got them to agree that they could live with it. Now there appears to be a problem, and I just wanted to go over it with you. Straighten me out, if I am wrong.

The law allows for continued ocean dumping of sludge beyond the December 31, 1991 date, provided that certain fees and penalties are paid. Once we get to 1992, the penalty is $600 per dry ton. Is that correct?

Mr. MUSZYNSKI. That is correct.

Mr. LENT. I am directing this to either Mr. Davies, or the acting regional administrator, Mr. Muszynski.

It is your position, is it not, that sludge dumping is permitted beyond the 1991 date, provided that these fees and, subsequently, penalties, are paid according to the statute?

Mr. MUSZYNSKI. It is our position that dumping after December 31st, 1991 is illegal, and that the only time that we would permit that is after we have been convinced, through the negotiation process, that the authorities, or the county, cannot be out by either interim alternatives or by a full-fledged alternative.

So that to the degree that there is a reasonable need to go beyond that date, we feel we can do so under the penalty provisions and under the law, but that our negotiation status with them—with all of the authorities, for that matter—has been to try to get them out by December 31, 1991.

Mr. LENT. Let me just read from the statute because I do not think you are following the letter of the statute, and I am looking at "Enforcement Agreements," subparagraph three.

It says: "An agreement shall be an enforcement agreement for the purposes of this section, only if it includes a plan negotiated by the person, the State in which the person is located, and the Administrator that will, in the opinion of the Administrator, if adhered to by the person in good faith, result in the phasing out and termination of ocean dumping, and transportation for the purpose of ocean dumping, of sewage sludge and industrial waste by such person through the design, construction, and full implementation of an alternative system for the management of sewage sludge . . ." It goes on.

According to my understanding, those who cannot implement ocean-dumping alternatives by the deadline must sign one of these enforcement agreements.

Mr. MUSZYNSKI. That is correct, but——

Mr. **Lent**. Okay. And these agreements impose fees beginning at $100 a ton, starting in 1989, rising to $200 a ton in 1991. Is that right?

Mr. **Muszynski**. That is correct.

Mr. **Lent**. And these fees are returned to the dumpers, to help develop alternatives?

Mr. **Muszynski**. The major portion of them; yes.

Mr. **Lent**. And enforcement agreements also impose penalties beginning in 1992 at $600 a ton, and then those penalties increase quite sharply?

Mr. **Muszynski**. That is also correct.

Mr. **Lent**. Okay. A portion of those penalties are returned to the dumpers, as well, to develop alternatives to ocean dumping.

Now, based on that sort of a scheme, Nassau County endorsed this legislation. They now find—according to the testimony of Mr. Fangmann—that EPA is proposing to assess penalties of $10,000 to $50,000 a day, in addition to the annual fees and the penalties I have just read off under the Ocean Dumping Act. Is that true?

Mr. **Muszynski**. No; that is not correct. His interpretation is incorrect. Let me first——

Mr. **Lent**. Well, he would be glad to hear that, I am sure.

Mr. **Muszynski**. Well, let me explain, though.

Mr. **Lent**. Yes.

Mr. **Muszynski**. Under section 104(B)(a)(1)(b) of the Act, it did say that after December 31st, 1991, it shall be unlawful for any person to dump into ocean waters or transport for the purposes of dumping into ocean waters, sewage sludge or industrial waste.

So, yes, you can go beyond that date under the penalty provision, but I think the first intention of the law was to end it by that date.

Mr. **Lent**. If you go beyond that date, you pay the civil penalties.

Mr. **Muszynski**. Well, the penalties that he is referring to, that we are negotiating, are stipulated penalties, if they violate the schedules that we agree with them on now as part of the judicial consent agreement.

Mr. **Lent**. Well, is there any authority that you can find in this Act to require the cessation of all ocean dumping by the end of 1991, even if a municipality such as Nassau County, is prepared to pay the fines called for by the Act?

Mr. **Muszynski**. I believe that the section that I just read off gives us the authority, if we can demonstrate that there are alternatives available to the authority before that date.

Mr. **Lent**. But the burden would be on you to show an alternative?

Mr. **Muszynski**. The burden is always on us.

Mr. **Lent**. Nassau County relys on a sole-source aquifer. We cannot put this stuff under ground after 1991. That is a State law. We cannot put any more sludge or garbage, or anything, under ground. What is your alternative?

Mr. **Muszynski**. There are a variety of alternatives that I think—on the interim basis there is—the county has advised us that they are looking at dewatering of this material and trucking it to out of county, and possibly out-of-State landfills.

On a longer-term basis, they are looking at alternatives such as the Carver-Greenfield process, that could convert it to a fertilizer-type material.

It does not have to be an alternative that deposits the material, either haphazardly or improperly, within the county boundaries.

Mr. **Lent**. Now you know that the county submitted to EPA an enforcement agreement and a schedule, where they were going to use the Bay Park sewer disposal facility, where there is a plant now, and they were going to set up and build in a normal way, a dewatering facility where sludge could be dewatered, and then perhaps taken somewhere off Long Island, for whatever purpose. That plan calls for a complicated capital schedule of buildings to be built before the sludge facility would actually be started up.

The county believed, and I assured them that this was the case—and the legislative history bears that out—that if they were willing to pay these penalties of $600 a ton, and upward, they could continue to put that sludge at the 106-mile site.

Miss **Schneider**. Would the gentleman yield, please.

Mr. **Lent**. I would be happy to yield.

Miss **Schneider**. As one of the authors of this piece of legislation—and granted, the panelists here are responsible to implement this legislation—I can assure you that in discussion that we had in the formulation of this legislation, it was very clearly intended that any dumping after December 31, 1991, as it says in section 104B(a)(1)(B), shall be unlawful for any person to dump into ocean waters.

Whether you pay, or do not pay, after the fact, the bottom line is that it is unlawful, and that was the reason that we made this language so very, very clear.

The penalties are strictly an interim means of putting additional pressure on those who are failing to move rapidly toward that compliance date, but I think that not only is the legislation clear—as Mr. Muszynski has indicated—but I think that the report language that we also labored over, and in conference committee, sets it out pretty clearly that 1991 is it, and that is——

Mr. **Lent**. I thank the gentlelady for her contribution, and I have the greatest respect for the gentlelady. But was it not also contemplated that where there would be communities that would not be able to meet that 1991 deadline, that they would pay these penalties which we set up in the statute?

And that the penalties would be recycled back into helping those communities find a way, or build the buildings, or rent the trucks, or whatever was required to get the sludge some place else other than the 106-mile site?

Miss **Schneider**. I think that the bottom line is that EPA, after their assessment of Nassau County has determined—as the witnesses have stated—can meet the next deadline. I believe Mr. Kiselica, you had said something to that effect, is that right?

[No response.]

Miss **Schneider**. I mean, we have the technology—this committee, and the Science and Technology Committee—before Mayor Koch and others had clearly indicated that we have at least six technologies, in hand, that we can solve the problem with.

And I believe I have heard testimony here today, on the part of EPA, that said that Nassau can meet the deadline.

Mr. **Muszynski**. The schedule that Nassau has provided us was 50 percent out by December 31st, 1991, and a 100 percent out by June 30th, 1992. Using, albeit it an interim alternative.

Miss **Schneider**. Right.

Mr. **Muszynski**. Their full-fledged alternative will take them into the 1994-1995 range.

Miss **Schneider**. Well, that is why I was so concerned earlier, asking questions about information transfer and technology transfer, because, granted, they do have a plan, but as this technology is developed, I think that it is critical that we move it to those communities that are in——

Mr. **Lent**. Well, as I read the statute, it says it is unlawful, but nonetheless, the design of the statute contemplated a situation such as we have in Nassau County where the county would have the right to continue the dumping, notwithstanding the date, provided they pay the fee or the penalty as the case may be.

I would like to know where you get the authority—if that is the case—for imposing fees of between $10 and $50,000 a day. Where does that come from?

Mr. **Muszynski**. The penalties that we are talking about are stipulated penalties applicable if they violate, and only if they violate the terms of the judicial consent agreement they are negotiating with us.

Mr. **Lent**. Wait a minute. If they violate the law, the penalty is provided in the statute. It is $600 a ton; not $50,000 a day.

Dr. **Davies**. In addition, Mr. Congressman, we also have the Marine Protection Research and Sanctuaries Act under which we have stipulated penalties, all violations of the Ocean Dumping Act, and I think we are talking here about variations from the judicial agreements.

Mr. **Muszynski**. I am checking. I think there is also a section—if I could get back to you on it—that also provides for penalties, administrative penalties for violating the schedules entered into.

Mr. **Carper**. Mr. Lent, we have got about five minutes remaining on this vote. There are three votes. The first vote is a 15-minute vote.

Mr. **Lent**. Is it the intention of the Chairman to continue following the vote?

Mr. **Carper**. Yes. We will come back. I think Mr. Pallone will be next up. And we will be reconvening at approximately 3:30.

[Recess.]

Mr. **Carper**. The panel will reconvene its hearing,, and Mr. Hochbrueckner from New York has joined us, and is recognized for questions.

Mr. **Hochbrueckner**. Thank you, Mr. Chairman. Obviously we have a great concern on Long Island in terms of ocean dumping, as you know. We had an extraordinarily terrible summer last year, when we had wash-ups on our beaches of medical wastes and other things.

There are five major areas where relevant Congressional action has taken place. First, restoration of Coast Guard funding, over $60 million, in order to help keep the beaches clean. This is connected with the ocean-dumping problem.

Secondly, the Plastic Pollution Control Act, banning the dumping of plastics in the ocean, anywhere in the world by U.S. ships, or within 200 miles of our coasts by foreign ships, is a very important program.

Certainly, the medical waste-tracking law, which we probably will also be doing some additional hearings on, is one that is troublesome. The EPA has been defining certain items of medical waste as not being medical waste for purposes of the statute. That is a fight yet to be fought.

The ocean dumping law itself, which I will have a question on in just a moment, is important, and a major element. Finally, the fifth element, in terms of keeping the beaches clean, is related to the combined sewage overflow situation in New York City, wherein rain water is combined with the effluent from toilets. Whenever they get a rain storm, they end up with overflows. Of course, the floatables end up on our shores.

Since today is devoted to the ocean dumping, my main question for you folks is, How do you think we are doing with the implementation of the ocean dumping law? Do you think New York City has a chance of making it? Should we try to make the fines tougher in order to in fact get them to meet the dates, if you feel that they are not going to meet them?

What is your feeling about New York City's ability to meet the target date?

Mr. **Muszynski**. I think I used the term "cautiously optimistic" earlier today. The current status of our negotiations with them indicates that by using an interim technology they should be 20 percent out by December 31st, 1991, and potentially a 100 percent out by June 30th, 1992.

We recognize that the technologies they are talking about are still not yet totally defined; that they are going out for requests for proposals from private purveyors to reach that; they are going to dewater, more than likely, landfill, or some re-use technique on that.

Mr. **Hochbrueckner**. Excuse me. Could you repeat the second percentage you gave in terms of 1992.

Mr. **Muszynski**. They should be out, a 100 percent, by 1992, June 30th, 1991. Again, it is dependent upon getting the proper proposals, those proposals being within relative financial reasonableness, and also whether they are practical, and technologically feasible.

But that is the current level of negotiations with them. The full alternative that they would use still does look to the 1996-1998 range.

Mr. **Hochbrueckner**. Thank you. Any other comments?

[No response.]

Mr. **Hochbrueckner**. Thank you, Mr. Chairman.

Mr. **Pallone**. [presiding.] Thank you. Mr. Manton, did you want to ask some questions?

Mr. **Manton**. I have no questions, but I would like to ask unanimous consent to submit an opening statement for the record.

Mr. **Pallone**. Certainly. So ordered. Thank you.

I am going to go back to what I stated before. I wanted to get a response either from Mr. Davies or from Mr. Muszynski, concerning my opening statement. I guess you were not here, Mr. Muszynski, so let me repeat.

I mentioned two things. One was my concern that the EPA has not adopted specific criteria that regulates the quality of sludge dumped into the ocean. My feeling is that if you do not start cleaning up the sludge now, you never will get the sludge clean enough for the beneficial uses that are suggested in your statement.

And finally, that pretreatment is the key to that; that the EPA should say that the sludge cannot go to the ocean unless it has met certain standards, and that in fact those standards would force pretreatment.

And one of the things I wanted to mention is that when I sent a letter—I guess it was to the EPA Administrator about this, at the time when certain regulations were being promulgated—not with regard to sludge standards, however—that the response that I received back—and this is within the last few months—basically said that the EPA was not moving ahead with those type of criteria or standards for ocean dumping of sludge because they expected us to be out of the ocean by 1991.

Mr. Davies mentioned before, that right now, the EPA, as part of the permit processes, is requiring a reduction in the discharge rates, and my feeling is that when you reduce the discharge rates you are not really getting to the problem of sludge criteria.

You know, environmentalists often use the phrase, "The solution to pollution is not dilution." When you are reducing the discharge rates, you are just diluting the sludge, but we still need criteria for ocean dumping so that the sludge is not as toxic as it is now.

And I just wondered why the EPA is not promulgating those standards. Either one of you could answer it.

Mr. **Muszynski**. The standards that you are referring to have not really been promulgated, they were proposed, and from what I understand of those standards they are going to go through a lengthy comment period. I really do not have a target date for when those actual standards would be finalized.

But those standards are set up for land-based alternatives. Now obviously the sludge from the sewage authorities and the city that we are talking about here would have to meet those standards for the land-based alternatives. The reasoning behind not promulgating additional standards for ocean, is that by the time we would anticipate those standards being in effect, hopefully we would be well out, if not completely out of the ocean.

The toxicity of the sludge is being handled, we believe, through the reduced dumping rates, and we do that through the bioassay techniques that we use, and we do have to address water-quality standards in the vicinity of the dump site.

Mr. **Pallone**. But in other words, the reason then, basically, is that you feel that since you are going to be out of the ocean within a few years, that we will not, in effect, worry about, because ultimately, when you go on land, whether it be land fill or incineration, you are going to have to meet the existing land-based standards?

Mr. **Muszynski**. Not only that, but in addition, we are talking to the authorities about pretreatment requirements that they would have to put in place to meet their land-based alternatives and putting them on schedules, and unfortunately putting pretreatment in place does not occur overnight. That it generally takes at least 12 to 18 months for anybody to put a particular standard in effect anyway, and then have that standard effectuated by the industry, or by whatever entity has to do it to meet that requirement.

Mr. **Pallone**. Well, one of the package of bills that was passed on the State level in New Jersey last year required pretreatment for New Jersey authorities, and said, for the first time, that ocean disposal would have to meet land-based criteria or land-based standards.

See, my point is that if you had those standards for the ocean, if they were similar to what is on land, that in effect you would force pretreatment and you would get us out of the ocean quicker.

And I am not sure that I understand what is being done in that regard now. I mean, how is the current pretreatment program designed to meet the land-based standards so that these authorities can get out of the ocean?

Mr. **Muszynski**. I really cannot comment on the State law.

Mr. **Pallone**. I mean, on the Federal level, then.

Mr. **Muszynski**. On the Federal level, pretreatment standards are in place in all of these authorities to meet primarily the effluent requirements under the Clean Water Act.

The standards that would go into place for land-based alternatives are not promulgated yet. I do not have a date for which they would be promulgated.

Mr. **Pallone**. Well, how can they get out of the ocean then and meet these deadlines for land-based alternatives without those standards being promulgated?

Mr. **Muszynski**. With the exception of these nine authorities every other——

Mr. **Pallone**. No, but I mean for the nine.

Mr. **Muszynski**. ——every other municipality, et cetera, is out of the ocean.

Mr. **Pallone**. No. I understand, but I am talking about——

Mr. **Muszynski**. The standards possibly would change, and they would have to meet whatever the final standards are. I think you are aware, that as those standards do get promulgated for land-based alternatives they would have to meet those criteria. There are current standards, though, whether you use it for agriculture, or whether you use it for land farming, or forestry, or whatever purpose you would use sludge for, that they would have to meet now, and that is what they are looking at.

Mr. **Pallone**. No, but what I am saying: My problem is, you are saying that it takes time for those standards to come into place, and for the authorities to meet them. If we are not in the process of having them meet—the nine that are still dumping in the ocean—if we are not in the process, and accelerating the pace for them to meet those standards, how would they meet your 1991 deadline?

Mr. **Muszynski**. They are going to meet the 1991 deadline, I believe, based upon our discussions with them, primarily by putting it in a landfill.

Mr. **Pallone**. But aren't those same standards applicable?

Mr. **Muszynski**. There are certain State standards for land filling, but in general they are obviously not as stringent as they would be for land farming, for composting. So they are meeting that by interim standards. In order to get them to their alternative technologies, be it incineration, or be it re-use in some other capacity, the schedules do, or the negotiations have included discussions with them about putting pre-treatment in place, that would be necessary.

But remember, the alternative technologies are being looked at into the 1994 through 1996 range, so there is time to put that pretreatment into place.

Mr. **Pallone**. I do not want to keep belaboring it, but I still do not understand. Now you are saying, then, that the standards for land fill are significantly less, and that those that are dumping in the ocean now could currently landfill under—that would meet the landfill standards?

Mr. **Muszynski**. They would meet the landfill standards. That is correct.

Mr. **Pallone**. Well, my understanding always is that the major reason why they dumped in the ocean was because they could not make the landfill or the alternative-land-based standards. But again, I guess it goes back to the same thing: That if they are not on an accelerated program for pretreatment, then landfill is going to be the only alternative until they are on that accelerated program, it would seem to me.

Mr. **Muszynski**. That is what we are negotiating with them, schedules to put pretreatment in place, so that the could go to their alternative systems.

Mr. **Pallone**. The second point that I had was my concern that both on the Federal level—the EPA, and also in New Jersey, which I will get to with the New Jersey people—have not demonstrated significant commitment to find land-based alternatives that make the most sense from an environmental point of view, and specifically that I want sludge re-used, not incinerated or land-filled, and for New Jersey, in particular, that the land-fill option is not really viable because at some point, Pennsylvania, for example, will no longer take our sludge.

And again, the whole notion that incineration—which seems to be the way that certainly the New Jersey authorities are moving—is objectionable to a lot of people, and because of the objection that we will get from it, ultimately, we will get a popular outcry to go back to the ocean.

So that, really, what we need to do is to encourage re-use through composting and other options. Now, I noticed in your statement, Mr. Muszynski, you say that the EPA promotes those alternatives that provide for the beneficial use of sludge while maintaining or improving environmental quality, and then you go on to say, though, that in the case of the New Jersey authorities, as a long-term alternative, each of these proposes to build incinerators on site.

It seems to me that that is inconsistent. In other words, if we are trying to encourage beneficial use—which I take to mean recycling, composting, whatever—that the EPA should not accept incineration as the long-term solution for the New Jersey authorities, and I just wanted to know what EPA is doing in that regard.

Mr. **Muszynski**. Well, the difference is that while we can promote the beneficial use of sludge, we cannot mandate it and require it. The authorities, not only here, but every place, have the right to choose which alternative they will use to reach their goal. We cannot just simply dictate that they pick a particular technology, or a particular use option. We can promote it only to the tune of making them aware of these technologies, having standards for those different uses, but it is up to them to choose because that is, in a sense, the way the law was put together, even under the Clean Water Act.

Mr. **Pallone**. Well, isn't there some way, pursuant to the legislation that we are discussing today, that through the consent agreement process, or through the judicial process—I know there is a compliance agreement and I guess the other one is——

Mr. **Muszynski**. Enforcement.

Mr. **Pallone**. ——enforcement agreement—that you can encourage, or basically, you say, promote alternatives to incineration? I am just very much afraid of the fact that in New Jersey, in particular, they seem to be looking only at incineration once the landfill option is no longer there.

Mr. **Muszynski**. Well, in Middlesex County as——

Mr. **Pallone**. That is an exception; yes.

Mr. **Muszynski**. Yes. It is an exception that goes without saying, in a sense, that they have looked at, and have selected the technology, at least looked at a technology that seems feasible for them, that does not use incineration. The New York authorities are also looking at technologies, hopefully with incineration being one of the lower priorities, so the system works if they choose to look at those facilities.

We can only promote; we cannot require.

Mr. **Pallone**. The Middlesex one, as you mentioned, is a good example, and I know that that has been cited by many as a system that seems to be moving in the right direction. So, I am glad you mentioned that alternative.

I just wanted to ask one thing that was brought up before, basically with regard to the Inspector General's report. You have this four-tiered system, and we have been told that basically, there are methods in place to deal with the first tier and the second tier. But that the fourth tier, which basically looks at the long-term effects of dumping at the 106-mile site is not really being implemented at this point.

I assume that you have to respond to that Inspector General's report, and if someone would comment whether or not, as a result of that report, there is going to be more movement towards that fourth tier, or looking at the long-term effects, and what your response is.

Dr. **Davies**. I think our response is that the statute gives us both funding and responsibility to investigate the far field concepts, and at the workshop that we had with NOAA and with Coast Guard, and with the technical community, we agreed that we would move into that area. However, we felt that it was appropriate to move into the far field, but we had to understand the near-field issues first of all.

That many of those near-field issues, monitoring issues, allowed us to have a scientific basis for reducing the discharge rates from the barges. And we will be preparing a formal response to the Inspector General's report very shortly.

Mr. PALLONE. Thank you. I had some more questions, but, Mr. Lent, did you want to ask some questions?

Mr. LENT. Thank you, Mr. Chairman. I would just like to get back to this point that we were discussing earlier with reference to my understanding of the situation in Nassau County.

Mr. Davies, or Acting Regional Administrator Muszynski, do you agree that the Ocean Dumping Ban Act does allow for continued ocean disposal of treated sewage sludge beyond December 31, 1991, provided, one, the civil penalties are paid as called for in the Act; two, the county signs an enforcement agreement with you; and three, EPA issues a ocean-dumping permit?

Mr. MUSZYNSKI. Yes. I agree.

Mr. LENT. Is the EPA saying that the interim solution, or the interim agreement must require the county to cease all ocean dumping by the end of 1991?

Mr. MUSZYNSKI. What we are saying is that we are looking with them at interim alternatives to reach that particular date, and if those interim alternatives are available, and can reasonably be put in place by that date, that we would expect them to meet that date.

Mr. LENT. I thank the gentleman for that response. I want to clear up one other point about the penalties. The penalties in this statute for violation for continued dumping beyond 1992 are $600 a dry ton, increasing sharply as the years tick by. You also said you could apply penalties provided under the Marine Protection Research and Sanctuaries Act, which could be in the vicinity of $10,000 to $50,000 a day. Do you recall that colloquy we had earlier?

Mr. MUSZYNSKI. Yes. I recall that.

Mr. LENT. Is that still your position?

Mr. MUSZYNSKI. That is still my position, including—I did find the section that we referred to in the Act. It is on page nine of my copy. Section G, item three also gives us the——

Mr. LENT. I have that in front of me as well. Entitled "Actions"?

Mr. MUSZYNSKI. That's correct.

Mr. LENT. Let's just walk through that for a minute.

"The Administrator may request the Attorney General to commence a civil action for appropriate relief, including a temporary or permanent injunction and the imposition of civil penalties authorized by subsection (d)(1) for any violation of subsection (a)(1) or of an order issued by the Administrator under this section. Such an action may be brought in the District Court of the United States for the district in which the defendant is located, resides, or is doing business, and such court shall have jurisdiction to restrain such violation and require compliance with subsection (a)(1) and any such order." Period.

Now, is that the section that you are relying on for the imposition of a penalty on top of the penalty provided for in the Ocean Dumping Ban Act itself?

Mr. **Muszynski**. It would be a penalty if they violated any of the schedules or the enforcement agreement that we negotiated with them; yes.

Mr. **Lent**. If the county violated the enforcement agreement, or the schedules contained therein, then this language that we have just read would allow EPA to kick in the additional penalties contained in the Marine Protection, Research, and Sanctuaries Act?

Mr. **Muszynski**. The stipulated penalties that are provided in the consent agreement.

Mr. **Lent**. I do not agree that the section gives you that authority but it helps me a great deal to know what you are thinking. I appreciate it.

Mr. **Pallone**. Thank you. Mr. Manton. We are on a second round.

[No response.]

Mr. **Pallone**. I just wanted to go back again, and then I guess we will finish up with the panel.

Mr. Lent's comments about the possibility, under the Act, of continuing ocean dumping beyond 1991, just brings home to me, again, the necessity for having criteria for ocean dumping of sludge, and again, Mr. Muszynski, I have a problem with the theory that it is not necessary to promulgate, or to promote those regulations because we perceive, at least, that we are going to be out by 1991, when in fact we know, or we hope that it is not the case but it is very possible that we are going to be going beyond 1991.

Ultimately, my problem is that without those kind of standards being applied, without them being proposed or promulgated, there continues to be a danger of harmful effects resulting from the continued dumping of sludge, and at the same time we are told that we have not really studied the long-term effects.

So, all these things run together in my mind as to what plan of attack we really have for getting out, or how realistic our plan of attack really is for getting out.

I do not know if the question was asked, but I wanted to ask this again. When you say that you are involved in proposing alternatives to the dumpers, and we have been told—for example—that in the case of New Jersey—and I suppose some of the other authorities, on an interim basis, plan to use out-of-State landfills, to what extent do you look at that realistically? In other words, to what extent during your negotiations, do you take into account the fact that they may not be able to use those out-of-State landfills? Has that been part of the discussion?

Mr. **Muszynski**. Yes; it has. We have discussed with them that particular issue. I think there is one authority that has given us a letter with a particular—I think it is from actually, a State agency in Pennsylvania, indicating that they can bring their material there. That is why we continuously say we are somewhat cautiously optimistic, in a sense that we do not have signed, sealed contracts and agreements. In some cases they do not have the equipment in place to do the necessary dewatering.

We are, in a sense, taking it, after reviewing their schedules and using our engineering judgment, taking it on faith that those dates can be met and put into place.

Mr. PALLONE. Well, what kind of assurances do the New Jersey authorities have that they are going to be able to transport out of State?

Mr. MUSZYNSKI. To the best of my knowledge, right now, there is only one authority that has sent us a letter, actually from a particular agency—I think it is a State agency—indicating that they can bring their sludge to a specified landfill in the State of Pennsylvania.

Mr. PALLONE. But are there any agreements with these out-of-State landfill operators themselves?

Mr. MUSZYNSKI. Not that I am aware of.

Mr. PALLONE. I am told that that specific one is only for 14,600 tons per year, which is a very small amount. It was mentioned before that the New Jersey authorities have brought suit because they do not like the fact that they have been placed under enforcement agreements as opposed to compliance agreements.

And I guess this goes back to your feeling that they may not be able to use these out-of-State landfills. That is part of the problem with that. Is that correct?

Mr. MUSZYNSKI. It goes back to our interpretation of the law. Number one, it was necessary to have alternative systems in place by December 31st, 1991 to get out of the fee. That you could use interim technologies, and in fact it is my belief that Congress intended them to use interim technologies to beat that date, if possible. But that you had to have in place alternative technologies.

Since none of the authorities—with the possible exception of Middlesex, and we have to look at their schedule again—can demonstrate an alternative technology in place by 1991, then they are covered by the enforcement provisions of the Act.

Mr. PALLONE. So that is in part, perhaps, because of their interim plans for out-of-State landfill, and in part because they have proposed incineration?

Mr. MUSZYNSKI. The absolute first reason is because they cannot have alternative systems in place by December 31st, 1991.

Mr. PALLONE. What is going to be the effect of this suit on the implementation of the Ocean Dumping Ban Act? I mean, what is likely to happen?

Mr. MUSZYNSKI. Well, the effect thus far has been that we have lost three weeks of negotiations. They essentially refused to continue negotiating up until roughly last week, when we resumed negotiations with them. It was my opinion at the time that they indicated they wanted to break those negotiations, that there were a lot of other things that we could get out of the way while we were having this agreement.

We have now resumed those negotiations. It is my hope that I guess we can convince them during this process. If not, there will be a point in time when I have to make another decision as to what action I will take to ensure the law is complied with.

Mr. PALLONE. Believe me, I am not discouraging you. You know, I can certainly understand why you feel that it is in the nature of an enforcement action, because of the problems with the alternatives that have been presented. I mean, that is why I think you are acting, in part, in that way. I can certainly understand it.

Mr. **Muszynski**. Thank you.

Mr. **Pallone**. Any other questions?

[No response.]

Mr. **Pallone**. I thank the panel very much for appearing here today. We certainly have learned a lot and I appreciate your being here and answering the questions.

What we are going to do, in the interest of time, is combine panels two and three. So I would ask that Mr. Marsh from the DEC in New York, Mr. Deieso from the DEP in New Jersey, and the representatives from the various sewage authorities all come up at this time, and we will combine the two panels.

Thank you, gentlemen. In the interest of time, your full statements will be submitted into the record, and I would ask if you could summarize those statements, rather than read the entire statement at this time. And we will start with Mr. Langdon Marsh, Deputy Executive Commissioner, Department of Environmental Conservation, the State of New York.

STATEMENT OF LANGDON MARSH, DEPUTY EXECUTIVE COMMISSIONER, DEPARTMENT OF ENVIRONMENTAL CONSERVATION, STATE OF NEW YORK

Mr. **Marsh**. Good afternoon, Mr. Chairman. I am appearing on behalf of Thomas Jorling, the Commissioner of the State Department of Environmental Conservation, and I appreciate the opportunity to be here.

As has been testified at length already, New York State, along with Federal agencies, have engaged in intensive negotiations with New York communities which currently dispose of municipal sludge through ocean dumping, and we are confident that these negotiations will be successful.

Even though the obstacles to implementing alternative sludge disposal methods are considerable, we expect that each enforcement agreement will constitute a binding commitment by all the parties to undertake whatever is necessary to end the practice of ocean dumping at the earliest possible opportunity.

There are time constraints, financial impacts, citizen concerns that will put obstacles in the way of early implementation, but the schedules that have been submitted, to date, show that the deadlines can be met, or substantially met while the communities seek longer-term solutions to their problems.

My written testimony indicates the steps that Nassau and Westchester County are taking. A dewatering commitment has been made by all communities— Nassau, Westchester, and New York City. Nassau and Westchester have issued proposals. We are looking forward to seeing New York City's draft request for proposals to the private sector to see what kinds of interim solutions can be put into place.

And we are pleased at the effort that New York City has undertaken in terms of designing and implementing its dewatering facilities at a substantial cost. We estimate the City's at around $289 million, certainly a very substantial commitment.

The enforcement agreements do constitute a fast-track approach that Mr. Muszynski has well described in his testimony, and depend very heavily on the responses from the private sector which I think underscores the magnitude of the efforts that are being undertaken by these communities in New York.

It may require, at some point in the future, some adjustment in the schedules as we learn more about the nature of the tasks ahead. So we are interested in working cooperatively with the communities and the Federal Government to solve the problem, hopefully without litigation. I am confident that we can continue on that path.

I would point out that any solutions, interim or long-term, must comply in addition to Federal mandates, with State statutes as well. We have a State Environmental Quality Review Act similar to NEPA, which requires that reasonable alternatives be evaluated for any proposed action, and our Solid Waste Management Act, passed last year, permits local governments to establish local solid-waste management plans which must be in place as of the end of this year, as a condition of approval for any permit for projects, including sludge projects.

So, in addition to all of the hurdles that have been described heretofore in terms of the enforcement agreements, there are also State statutes that must be complied with.

In addition, our State statutory framework requires that communities first look at waste reduction, recycling and re-use before they can examine incineration and landfilling.

So the preferred sludge management method in New York is reuse and recycling, as much as possible, through composting, land application, and so on, which requires a good quality sludge. We have regulations that apply to landspreading that are fairly stringent.

We have some concerns about the new proposed Federal standards for disposal of sewage sludge that are presently out for comment.

In their present form, they may significantly reduce the viability of recycling and re-use programs. We, and the other States, have been working with EPA to come up with a realistic and practical set of Federal requirements on landspreading.

I would underscore what others have said, that landfilling is probably the most likely interim solution, but in terms of any long-term feasibility is highly questionable because of the capacity crisis that we all face.

Incineration is being looked to. We have some real concerns about that, and are participating with EPA and New Jersey in a modeling study, to look at background, ambient data in the metropolitan area; but we also feel that there must be a baseline sampling study to get data on air quality in the metropolitan region against which to evaluate all the various incineration proposals—sludge, garbage, and so on.

We understand that in the hearings that took place last month there was considerable opposition to the permits that are proposed to be issued to the dumpers, and we have certainly high hopes that that will not result in a situation in which the permits and the enforcement orders cannot meet the August 14th deadline.

I would like to report that we have introduced legislation in New York—Governor Cuomo has—to establish the Clean Oceans Fund required by the Ocean Dumping Ban Act, and that we hope that this will lead to improvements in sludge management through pretreatment, and so on.

We will be reporting, as required under the Act, in September on our progress, and I hope by that time we will be able to report very substantial progress in meeting the goals of the Ocean Dumping Ban Act, and we certainly appreciate Congress's continued support in helping us toward the goal of elimination of ocean dumping. Thank you.

[The statement of Mr. Jorling can be found at end of hearing.]

Mr. **Pallone**. Thank you, Mr. Marsh. Mr. Donald Deieso, Assistant Commissioner from the Department of Environmental Protection, State of New Jersey. Nice to see you, Don.

STATEMENT OF DONALD DEIESO, ASSISTANT COMMISSIONER, DEPARTMENT OF ENVIRONMENTAL PROTECTION, STATE OF NEW JERSEY, ACCOMPANIED BY JAMES E. MUMMAN, DEPUTY DIRECTOR, DIVISION OF WATER RESOURCES; SHELTON LIPKE, SUPERINTENDENT OF PLANT OPERATIONS, PASSAIC VALLEY, NEW JERSEY SEWERAGE AUTHORITY

Mr. **Deieso**. Mr. Chairman, it is a pleasure to see you again. Congressman Hughes, greetings from our commissioner. I have with me today our Deputy Director of our Water Division, Jim Mumman. And, Mr. Chairman, as you requested, the full testimony entered into the record will permit me to be mercifully brief with the oral comments today.

Of course we are grateful for this opportunity. Our State is particularly fortunate to have the strong presence and leadership of Congressmen Hughes, Saxton, and Pallone on this committee, and we thank you for all your interest and efforts on our behalf.

New Jersey's interest in ocean matters is more than academic. The media blitz of the past two summers has left its scars. Notably our tourism industry has suffered an $800 million loss in revenue during the summer of 1988. But the focus is now spreading, as beach closures occur in New York, and shoreline conditions are being questioned in Virginia, the Carolinas, and Florida.

And while we continue to encourage more factual reporting and less hype, we also recognize that more work needs to be done to improve our coastal resources.

During the past 2 years, DEP has moved aggressively to institute several firsts in this regard. One, Operation Clean Shore is a program using our prison inmates. To date, they have walked over 12 miles of coast, have collected 1700 tons of debris that has now been disposed of in landfills, and I might add, parenthetically, of that 1700 tons, only 3 pounds of medical waste were found.

The second program we are quite proud of is our medical waste tracking system. Back in the summer of 1988, Governor Kean and Governor Cuomo together initiated the first program of its kind in the Nation, and it today serves as a model for the Federal program. Seven million dollars in fees are expected to run and energize that program.

Also this summer, the Corps of Engineers, in concert with New York and New Jersey agencies will use their skimmer boats in New York harbor to collect floating debris before it travels south and affects the tourism beaches, and travels east to the Long Island and New York City beaches as well.

Our Marine Police have added 76 additional police and 25 new boats that are on the water today. They will be very aggressive in their enforcement actions this summer. And the list goes on of many other measures we have in place.

With these accomplishments as a backdrop, let me move to the focus of today's hearing, and that is the ocean disposal of sludge.

With similar leadership, New Jersey enacted the Ocean Sludge Dumping Elimination Act of 1988, and I might add, in advance of the Federal statute.

New Jersey's action is elegantly simple. None of our authorities may dispose of sludge in the ocean beyond March 17th, 1991, period. There are no penalties; there are no fees; there are no opportunities beyond that date.

In contrast to the Federal statute, we have included this obligation in the existing permits that the six authorities have with us.

In short, this has afforded us a wonderfully powerful tool in that any of the permit violations are enforceable with up to $50,000 a day for any transgression can be levied against those authorities.

So we are pleased to report to you that that is something we have done, something we think has been, and will be quite effective.

I must also add, that of the accomplishments in complying with the Federal statute, all six of our authorities have submitted to us, on schedule, their plans for both interim and final disposal of their sludge, and of the six—you have heard earlier today—five are indicating in the interim that they will transport their sludge out-of-state. One is indicating that it will dispose of it at a landfill in state.

In the long-term, five indicate thermal systems; one indicates land disposal, specifically in a landfill.

The second measure we are quite pleased with is we have taken the necessary steps to set aside 10 percent of the State's revolving fund, as the statute requires. That money is set aside for the six authorities. It is available to them today. All they need to do is apply. And the third of our accomplishments: we have determined that we already have in the place the mechanisms to implement the Clean Oceans Fund, and we are proceeding to do so.

In closing, you have heard of the administrative actions that both EPA and DEP have in place to extract compliance from both the Federal and State statutes.

Considerable challenge lies ahead, however. Opponents to incinerators have already voiced their views. We have attached for your reference to the testimony just several of the recent news clips in which this is reported.

There is considerable misfact about sludge and its characteristics, and let me assure you that even the alternatives such as land application or sludge composting, while they may sound quite attractive, are not without their shortcomings and environmental consequences.

Most notably, finding sufficient open land within our State, especially in our heavily-populated northern counties, makes land application or composting difficult at best.

And pretreatment programs initiated by DEP over 5 years ago have already improved sludge quality, and further measures will continue to improve sludge quality.

So that we are clear, pretreatment programs will take years and cost 100s of millions of dollars to implement. It is not a quick fix. Pretreatment programs are advanced waste-water treatment systems and nothing more.

Your continued support and vigilance is most appreciated and we thank you for your attention.

[The statement of Mr. Deieso can be found at end of hearing.]

Mr. **Pallone**. Thank you, Mr. Deieso. We decided to include the third panel, and we will start with Mr. Shelton Lipke, Superintendent of Plant Operations for Passaic Valley, New Jersey Sewerage Authority.

STATEMENT OF SHELTON LIPKE, SUPERINTENDENT OF PLANT OPERATIONS FOR PASSAIC VALLEY, NEW JERSEY SEWERAGE AUTHORITY

Mr. **Lipke**. Thank you, Mr. Chairman. My name is Shelton Lipke and I am the Superintendent of Plant Operations for the Passaic Valley Sewerage Commissioners located in Newark, New Jersey. On behalf of the commissioners and the other five New Jersey ocean-dumping agencies, I would like to thank you for the opportunity to present our experiences, again, in trying to implement the provisions of the Ocean Dumping Ban Act of 1988.

The Passaic Valley sewerage commissioners are one of six agencies that dispose of sludge at the 106-mile dump site. All the six agencies have agreed to end ocean dumping by the New Jersey-mandated deadline of March 17th, 1991, over nine months before the Federal deadline of December 31st of that year.

Ocean dumping is history as far as we are concerned. We will be out by March 17th, 1991.

Today I would like to discuss the status of our compliance and enforcement agreements with EPA, and the progress we are making to implement the land-based alternative to ocean dumping.

As called for in the Act, the six agencies held a series of meetings with EPA and NJDEP to work out the required agreement. The agencies submitted schedules which would end ocean dumping on March 17th, 1991. We even agreed to stipulated penalties for missing the intermediate milestones.

In spite of our willingness to enter into a compliance agreement and end ocean dumping, the EPA insisted upon an enforcement agreement.

From both a monetary and equity viewpoint, we cannot enter into an enforcement agreement when we agree to comply with the statute.

We reluctantly filed suit in U.S. District Court to affirm our contention that we should enter into a compliance agreement rather than an enforcement agreement.

When this issue is resolved, we believe that the agreements can quickly be finalized as the other issues involved are relatively minor.

Whether or not we have an agreement in place, the six agencies are pressing forward with their land-based plans. Of the six, Middlesex County Utilities Authority has alone found an in-State solution which can be implemented by 1991.

They propose to chemically treat the sludge, to turn it into a soil-like material suitable for use as a cover material in a landfill.

The uniqueness of their solution is that they own and operate one of the last major landfills in northern New Jersey. The remaining five agencies are not so fortunate.

The areas that we serve send all of our trash and solid waste to landfills in Pennsylvania, Ohio, and other States. These out-of-State landfills have absolutely no desire to accept daily cover material even at no cost to them, but would rather take the sludge as a waste product for a large disposal fee.

Therefore, this option has been closed out to the other agencies. With such little time remaining until 1991, the only feasible interim alternative is land-filling of dewatered sludge in out-of-State landfills.

At PVSC we estimate that an average of 75 tractor-tailor loads of sludge will be shipped each day. For us, the cost of this alternative will be about $50 million a year.

To put that in perspective, our entire budget, for all operations, is only $62 million. What that means is approximately an 80 percent increase in our sewer rates starting in 1991, and these costs will be paid for by the poorest cities in the State of New Jersey, such as Newark, Patterson, and Jersey City.

The long-term alternatives selected by the other five agencies will be various types of incineration. Because we are one of the largest sludge producers in the world, at 560 dry tons per day, we propose to build the world's largest sludge incinerator complex in Newark.

We hired a nationally prominent engineering firm to design the facility, which would meet the most stringent air-pollution requirements probably in the country, those of NJDEP.

We researched technologies in the U.S., Europe and Japan to come up with a reliable system that could do the job. We are satisfied that what we propose will be absolutely the state of the art in this country in sewage sludge incineration technology.

But all that really did not help us when we had our public hearing on our sludge plan. The incinerator plan was received with a wave of negative reaction by the people living near the proposed facility, and I mean "negative" reaction. I think they were going to throw chairs at us when we proposed this.

The people really want a halt to ocean dumping but they do not want the solution in their back yard. In spite of the initial reaction, we hope to gain the acceptance of our neighbors and proceed with the long-term incineration alternative.

In closing, let me say, once again, that the six New Jersey agencies have agreed to end ocean dumping, unequivocally, by March 17th, 1991. We are currently designing the facilities necessary to convert our liquid sludge, which we dump at sea now, into a dry cake material suitable for land disposal.

We are pledged to do everything in our control to meet that date.

I would like to thank you, once again, for this opportunity, and I would be happy to answer any questions that you might have.

[The statement of Mr. Lipke can be found at end of hearing.]

Mr. **Pallone**. Thank you, Mr. Lipke. Next we have Mr. Steven A. Fangmann, Deputy Commissioner, Department of Public Works from Nassau County, New York.

STATEMENT OF STEVEN A. FANGMANN, DEPUTY COMMISSIONER, DEPARTMENT OF PUBLIC WORKS, NASSAU COUNTY, NEW YORK

Mr. **Fangmann**. Thank you, Mr. Chairman. A little background on what Nassau County has been doing. We presently dispose of approximately 45 dry tons at the 106-mile site. The county has had no objection to the cessation of ocean dumping of sludge, and in fact we had formulated a plan, and developed a schedule to stop ocean dumping prior to the passage of the Ocean Dumping Ban Act of 1988.

In the fall of 1987, Nassau County solicited and received proposals from various consultants interested in providing services with respect to sludge management planning.

In early 1988, we selected the consulting firm of Greeley and Hansen, and authorized them to proceed with a study to identify and evaluate available technological alternatives to the ocean disposal of sewage sludge.

This report was received by the county in December of 1988. The first issue which was to be discussed today was on the status of negotiations for compliance or enforcement agreements, including schedules for ending ocean disposal of sludge, and alternative plans.

Currently, we are in the process of negotiating with the USEPA to establish a schedule for the removal of our sludge from the ocean. This negotiation began actually early in 1988 as part of our ocean disposal permit process. On March 17th, 1988, a schedule was submitted to the EPA which included the following milestones.

The first one being 50 percent of our sludge volume would be out of the ocean by June 30th of 1991. The second part of our schedule called for a 100 percent of the sludge volume to be out of the ocean by July 31st, 1995.

In August of 1988 we revised that schedule, and we said that a 100 percent of the sludge would be out of the ocean by December 31st, 1994.

The time frame set forth in this schedule that I just discussed is basically based on sound engineering judgment and evaluations. Additionally, and just as importantly, it allows the county the proper time to complete a public participation program, and to involve the general populace of the county, as well as those people directly around the plant who will be impacted by any additional facilities.

Both the Cedar Creek plants and the Bay Park plants, which are the two largest plants in the county, are surrounded by residential communities, and these residential communities have civic groups which are very active in the community.

We have a long history of public involvement with these groups, and concerns over treatment plant operations, and the potential for odors, traffic, and noise impact.

It is our intention to involve the public in the entire alternative selection process so that the long-term sludge management plan selected by Nassau County will represent the best possible solution on a technical, economical and social basis.

Following the passage of the Ocean Dumping Ban Act, the EPA, and subsequently, the U.S. Justice Department, established a new position.

On December 2nd we received a schedule for meeting the August 14th, 1989 date in the Act for finalization of an ocean disposal permit and enforcement schedule.

The schedule required all of the ocean disposers to complete schedules and forward them to USEPA by January 3rd. This was approximately four weeks.

The county, by a letter dated January 6th, basically met the schedule. We forwarded a plan and phase-out schedule to the USEPA. This schedule called for Nassau County to end ocean disposal of sewage sludge by December 31st, 1991.

However, this would be accomplished by issuing a joint request for proposal with Westchester County, and identifying a feasible alternative from the responses received.

Basically, we felt that a private firm would be able to potentially meet the December 31st, 1991 date. However, should the request for proposal fail, we issued a second alternative and a secondary schedule which included a final plan to be completed by December 31st, 1994.

The length of time needed was based on the necessity to properly plan and implement a workable land-based alternative which would be put together by the municipality in question, Nassau County.

Such an alternative would have to be constructed at existing facilities, would have to be a plan that would call for the county to be out of the ocean on a long-term basis.

Basically, once you are out of the ocean you cannot go back, so we would have to be guaranteed that we would continue to be out of the ocean.

Subsequently, we have held a number of meetings. A meeting was held on February 6th in EPA as the first discussion point on our schedule. Aside from negotiating long-term schedules, we were told at that meeting that the December 31st, 1991 date must be met with both an interim plan and as well as talking about the long-term schedule.

However, all ocean dumping would cease by the end of 1991 even with the long-term plan in place.

During the meetings the county detailed why the December 31st, 1991 date was not possible. In order to receive proper public input and evaluate the impacts of odor, noise and traffic, and determine that a landfill site is available, the county proposed that the above-referenced schedule be accepted by EPA, that schedule being 50 percent of the sludge out by December 31st, 1991 and a 100 percent with a long-term plan by 1994.

We were advised that an enforcement agreement would only be considered and such agreement would allow for changed conditions by placing force majeure clause in such an agreements. Basically, since it would not be possible to meet a December 31st, 1991 date, various clauses would be put in the agreement which would consider such items as failure to receive proper bids, proper permits, et cetera, which would be outside of our control.

Basically, if something went awry in a very tight schedule, we would have some relief. However, penalties were provided for missing any of the dates in the enforcement agreement, and basically, these penalties go beyond the Ocean Dumping Ban Act requirement, in our opinion.

In summary, in exchange for entering an enforcement agreement, and receiving an ocean-dumping permit to continue to discharge at the 106-mile site, past August 14th of this year, the county would be liable for penalties of $10,000 to $50,000 per day from the day that the performance of noncompliance occurs.

Basically, if we miss a date in the restructuring we would be liable for other penalties. Such a schedule to meet the December 31st, 1991 date allows only for technological and cost-effective parameters to be looked at. Yes, we have discussed with EPA that, technically, something could possibly be done by December 31st, 1991. However, there are a lot of pitfalls in that, and there could be things that could go wrong in a very tight schedule.

It is the county's opinion that the December 31st, 1991 date does not allow for feasible alternatives to be properly evaluated. Feasible alternatives would include environmental and social concerns as well as technological and cost-effective ones.

One of the problems with a December 31st, 1991 date is that we would have to construct a dewatering facility at our Bay Park sewage treatment plant.

No other location would be able to be utilized and meet the December 31st, 1991 date. We object to this position for the following reasons.

Number one, the construction of this facility will place a large capital burden on the county's taxpayers which may be unnecessary, or have to be duplicated, if it does not fit into our long-range plans.

This is possible under the following first two scenarios, the first one being Nassau County, again in cooperation with Westchester County, has put out a request for proposals. This final request for proposal will be issued in June and receipt of proposals will be submitted in August. Should this effort be successful and a private venture construct facilities, the dewatering facilities that are already constructed, or at least partially through the design phase, may not be necessary.

The second objection—our scenario—is that we have found an alternative site for possible construction of a facility, but that we will not be able to look at this site with the time that remains. If another site is looked at beyond the existing treatment plant site, we would have to follow a full State Environmental Quality Review Act review, as discussed by the State just a few minutes ago.

Another objection, as far as building a dewatering facility at our Bay Park plant, is that the imposition of this facility on the residents, without prior consultation——

Mr. **Pallone**. Mr. Fangmann.

Mr. **Fangmann**. Yes, sir?

Mr. **Pallone**. I do not mean to interrupt, but we do want to get to some questions, and we do have your full statement. If you could just try to summarize.

Mr. **Fangmann**. Okay. I am cutting out the last part of my statement. I just wanted to get this part in.

The imposition of this on the residents around the Bay Park plant will possibly cause a delay in the implementation of the overall alternative. Basically, without good public participation the project can be defeated early on, which could cause problems in actually implementing the solution.

Thirdly, if a landfill site is not available after December 31st, 1991—basically, Pennsylvania closes its doors—we could have a facility that, again, could not be utilized.

These arguments were presented to the EPA and the Department of Justice; however, they have not deemed them of large enough extent to cause a change to the December 31st, 1991 date.

We will continue our negotiations with the USEPA, and hope that we will be able to come up with proper language in the enforcement agreement, and will be able to come up with a date that we feel we can meet, before we would sign such an agreement.

Regarding the permits which are to be issued this year on the ocean disposal of sludge, the biggest question came up on the rates at the dump site. The county has proposed evidence to the USEPA which shows that our sludge could be discharged at a higher rate, and we are asking EPA to consider that.

Otherwise, we feel we can meet much of the requirements in the permits, and in fact have voluntarily changed our discharge rate at the present time, and are presently discharging at approximately half the rate that we are presently required to discharge at.

Regarding alternative sites, and alternatives to ocean disposal of sludge, I think there was a good point brought up before, that the sludge regulations for land disposal are in the preliminary draft stage at this point, and basically, in a review of that versus the county's sludge quality parameters, it appears that copper concentrations may limit land application rates for Nassau County sludge products.

However, during the study we did find that there are four technologies which could be utilized for land disposal of sludge, one being co-incineration with an existing mass-burn facilities; a second one being incineration at a remote site; sludge drying or in-vessel composting.

We feel these can be utilized and we will be reviewing the sludge regulations as they are promulgated by the EPA.

One final concern is, again, the availability of existing landfills for disposal of dewatered sludge on an interim basis. We have requested that a list of available landfills be provided to us so that we can continue our investigations.

In summary, there appears to be feasible alternatives for sludge disposal on a long-term basis. The short-term or interim landfilling of dewatered sludge is much less feasible, if not impractical. And they also represent the highest-cost alternative for disposal of sludge.

On behalf of Nassau County, I wish to thank all the committee members for allowing us the opportunity to present this information. Thank you.

[The statement of Mr. Fangmann can be found at end of hearing.]

Mr. PALLONE. Thank you. And lastly we have Mr. Harvey Schultz, Commissioner, Department of Environmental Protection for the City of New York.

STATEMENT OF HARVEY SCHULTZ, COMMISSIONER, DEPARTMENT OF ENVIRONMENTAL PROTECTION, CITY OF NEW YORK, ACCOMPANIED BY EDWARD WAGNER, ASSISTANT COMMISSIONER, DEPARTMENT OF ENVIRONMENTAL PROTECTION

Mr. SCHULTZ. Yes. My name is Harvey Schultz, Commissioner, Department of Environmental Protection. I am here with Ed Wagner who is the head of our water pollution control program in New York City.

I want to thank you for the opportunity to update members of the Oversight, Fisheries, and Oceanography Subcommittees of the House Merchant Marine Committee on New York City's progress in investigating and implementing alternatives to the ocean disposal of sewage sludge.

In April of 1988, well before Congress acted to finalize the 1991 deadline, the city began the process of searching for a consultant to assist us in developing a comprehensive sludge management program.

Last November, the selected consultant, Stone and Webster, was hired to help begin our investigations into this pressing program.

The approximately $5 million contract with Stone and Webster was approved unanimously by the city's board of estimate in November 1988. In addition, we recently returned to the board with an approximately $36 million supplemental agreement to that contract, which was approved unanimously on May 4th.

The supplemental agreement provides an additional $12 million for the studies and data collection, and $24 million for work on dewatering, planning, and implementation. The funding is therefore now in place for professional consultants to help us identify our best options, and Stone and Webster, and their subconsultants, are hard at work, helping us to come as close as possible to meeting the congressional deadline.

In addition, we have formed an active Citizen's Advisory Committee to provide as much public input as possible into the choice and methodology for a new sludge disposal process or processes.

CAC membership includes representation from elected officials, community boards, business groups, environmental groups, and other governmental agencies, and members of the public.

There have been three meetings of the CAC thus far and one public meeting where DEP presented its schedule and plan to find an alternative sludge management program.

The CAC will be ongoing as we work to arrive at solutions, and we have no doubt that it will be of great benefit. The public must be a supportive partner on working with Government to identify the best alternative or alternatives to ocean disposal.

New York City last September also formed a dewatering task force consisting of New York City agency experts. As you may know, making decisions about this aspect of future sludge management is crucial, since virtually any sludge disposal alternatives will require dewatered sludge.

Three configurations for dewatering were considered: one, a centralized facility where all sludge is dewatered; two, dewatering facilities at almost all of the city's 14 water pollution control plants; and last, dewatering at some, but not all of the city's 14 plants.

Option three has been selected as the one that is most practical and gives us the most flexibility. We have developed a detailed facility plan for dewatering at eight sites, and are now proceeding to order the dewatering equipment and design the facilities that will allow us to perform this function on New York City property, an advantage because we can avoid time-consuming land acquisition procedures, and therefore expedite the dewatering part of the program.

We expect to formally order this equipment by July of this year.

Finally, the process to solicit sludge disposal proposals began last November with the publication 11 times in eight periodicals requesting expressions of interest from private operators for re-using or disposing of the city's sludge.

The request for proposals were mailed out on May 15th to 151 firms. This part of our program is being conducted to attract the widest possible range of firms, to investigate as many alternatives as possible, and to then find the best firm, or firms, to actually handle land-based sludge disposal alternatives.

We plan to conduct the RFP process in two stages. The first stage will require evidence that the firms are financially sound and have the expertise and experience to perform the services being proposed.

They will also have to describe the overall scheme and technology to be used, along with the method of ultimate re-use or final disposal.

We expect to receive all responses to the first stage of this inquiry by July of 1989. We will then evaluate these responses and develop category-specific second stage Request For Proposals.

By October, these second stage RFPs will be sent to the qualified firms, asking them to present detailed technical and cost proposals for the specific technology option they proposed. We will require an in-depth description of the scheme, technology and sites for performing the service, including a schedule, an operation and maintenance plan, warranties and guarantees, and the staffing and personnel to be assigned to the program.

We expect to receive the second wave of responses in February 1990. If the proposals received are feasible, we will then proceed to develop an interim program that will be available for public review by July of 1990.

The city has been negotiating with Federal EPA since early February on an enforcement agreement for ending ocean disposal.

Thus far, we have had a total of six formal face-to-face negotiating sessions.

The city decided not to join our neighbors in New Jersey in suing EPA, and is making a good-faith attempt to comply with Congress's intent as well as EPA's requirements.

Both we and our Federal regulators have devoted extensive time and energy to these negotiations, but have not yet reached a consensus.

Although we are trying to consummate the enforcement agreement, we do not yet have the details of a document worked out either to our or USEPA's satisfaction. New York City understands the consequences for not living up to a signed enforcement agreement, albeit the penalties that Congressman Lent spoke to before, and therefore, would not sign a document, knowing in advance we could not meet its conditions.

New York City will make every effort to end the ocean disposal of sewage sludge by the 1991 deadline. While we still doubt that this is a realistic goal, our analysis of the proposals we receive, and continuing discussions with experts may allow us to come closer to that deadline than we now envision.

Finally, we have also submitted extensive comments on EPA's tentative decisions on issuing ocean-dumping permits, which I will share with you for the record.

We have always conducted our ocean sewage disposal operations in compliance with stringent environmental criteria, and in cooperation with strict monitoring procedures. Our recent comments to EPA reflect our firm belief that permit conditions must continue to be based on sound scientific methods.

We are willing to continue to cooperate with EPA and other ocean scientists to insure that our ocean disposal practices continue to protect the marine environment until such time as land-based options are implemented.

In a final remark, I would just say that while our Nassau County counterparts gave you a very lengthy statement, we can attest to the fact that we have gone through almost the same blow-by-blow discussions with EPA, and have tried, in earnest, to come to grips with them about our problems, and I think that there is a good possibility that we will do so in the next couple of weeks, but there are still some sticky issues to overcome. Thank you very much.

[The statement of Mr. Schultz can be found at end of hearing.]

Mr. PALLONE. Thank you, Mr. Schultz. We are going to start our questioning with the gentleman from New Jersey. Mr. Hughes.

Mr. HUGHES. Thank you, Mr. Chairman. I just want to welcome the panel, and ask Mr. Marsh, perhaps, or some of the New Jersey witnesses, if they can tell me this. Has anybody checked with the Pennsylvania Department of Environmental Protection to see whether or not they will accept our sewage sludge in Pennsylvania?

Mr. MARSH. I will pass to Mr. Deieso.

Mr. HUGHES. Yes.

Mr. DEIESO. Congressman, yes, and let me sound the alarm. Sludge is solid waste, and as the 55 percent of New Jersey's solid waste today, the 6 million tons that is being exported out of our State because we have failed to develop disposal capacity—I can assure you, Pennsylvania, Ohio, Virginia, West Virginia, are crafting the laws now, as New Jersey did back 5 and 8 years ago, to stop the importation of all solid waste, including sludge.

It is the reason, in our State, that we have adopted the solid waste goal of self-sufficiency by 1992. We have selected 1992 because, in our judgment, that will be the date by which Pennsylvania will be successful in closing their doors to us; legally closing their doors to us.

Beyond 1992, it means, for our trash, and for our solid waste, and our sludge, specifically, that it moves further west. It moves to States that have yet to develop that pattern of law necessary to stop the importation, and with the move west, the migration west of this material, so goes the increase in disposal cost and transportation costs.

Mr. HUGHES. Let me read something to you, if I might, and then I will get your reaction, because it is right on target.

It is a letter addressed to the Chairman of the Subcommittee on Oversight and Investigations, the Honorable Thomas M. Foglietta. It is dated May the 12th, 1989, so it is recent, and it is from Arthur A. Davis who is with the Department of Environmental Protection in Pennsylvania.

And he is responding to an inquiry, and let me just read portions of it.

It says, "Landfills have been given until the second half of 1990 to come into compliance with the new standards or be closed down. During this transition phase, landfills are generally limited to accepting the amount of waste which they had received in 1987."

It goes on: "We are aware that certain New Jersey and New York municipalities affected by the ocean-dumping ban have expressed interest in using Pennsylvania landfills for disposal of their sludge."

It goes on: "Currently, 13 million tons of municipal waste is disposed of in Pennsylvania, one-quarter of which comes from out of State. It is highly unlikely that Pennsylvania landfills will be able to manage that additional waste in the near future."

It goes on from there: "At this time, we are not aware of any Pennsylvania landfill having filed for a permit modification to accept sludge from these municipalities."

I am going to skip over quite a bit of additional response. And he says, "Finally, the problem is complicated by the fact that the Department of Environmental Protection management has not been contacted, formally, by the States of New Jersey or New York about this issue, much less the municipalities that are affected by the ocean-dumping ban. They have never been approached." This agency did not even say that they intend to use Pennsylvania sites for their disposal need.

Mr. DEIESO. Well, let me respond, first, in the broadest sense. Pennsylvania's actions to stop the importation of all New Jersey solid waste is not something that is new to us. Secretary Davis expressed it over 2 years ago, and did so personally. The Governor of the State of Pennsylvania, understandably, is taking the legal measures necessary to stop all importation. New Jersey did it. We stopped the importation of Pennsylvania solid waste as we did New York City solid waste. In fact you might find it interesting that

Pennsylvania is mimicking exactly the same State statute we adopted in New Jersey.

So it is clear that they are going to stop us. Our legal estimate is that by 1992, they will have the law in place. Contrary to the suggestion, though, that today, Pennsylvania can stop, they cannot. There is an interstate commerce clause in the United States Constitution that prohibits a State from simply stopping importation.

So they need to assign it to their counties; the counties in turn plan, just as New Jersey has done, and painfully done so over the last 5 and 8 years.

So, we think we have until 1992. The fact that we have not contacted that department is not necessarily the issue. If the authorities have a contract in hand with one of the commercial——

Mr. HUGHES. Well, but that was my question, Commissioner.

Mr. DEIESO. Yes.

Mr. HUGHES. My question was, do they know anything about your——

Mr. DEIESO. Well, there is——

Mr. HUGHES. And they are in essence saying, no, we do not know anything about it except what we read in the newspaper, and, "No, we don't think that we have the capacity to take any more sewage sludge." And I suppose that they could do as New Jersey did, and move to stop the transportation by developing a plan that basically suggests that we cannot take any more.

Mr. DEIESO. Oh, they can, and they are moving to develop the plan. The plan means, though, that each county must have a plan of its own. It must go to the plan amendment hearings. It must adopt in a full public process that literally takes 18 months, 24 months. That must be ratified by State Government taking additional time, which is why we believe that——

Mr. HUGHES. It sounds to me like they do not want the sewage sludge.

Mr. DEIESO. Oh, Congressman, let there be no secret about it. They do not want New Jersey's sludge, nor do they want New Jersey's solid waste. Our saving feature, and the point of consolation I offer you, is that they legally cannot stop us until all of their planning is in place, and we estimate that that will be at least until 1992.

Mr. HUGHES. Well, we shall see.

[Laughter.]

Mr. LIPKE. If I may, I would like to add something. As a sewage authority, we had to look into this subject ourselves. We have been in contact with any number of landfills and we have contacted the State BER in Pennsylvania to determine just about how we go about allowing our sludge to get into the State of Pennsylvania. They said that there is an administrative procedure that must be followed, including taking samples, analyzing our sludge, and getting permits.

We have begun to do all of these items. We have never gotten any letters. In fact one of our authorities has actually gotten permission to get into it with the State of Pennsylvania. I would like to say that at one of our sludge task force meetings with the State of New Jersey, which we hold on a monthly basis, we asked the State to intercede on our behalf, and to begin some discussions with the State of Pennsylvania to determine whether or not they would have any formal objection.

And at that point they said, in their opinion, that was not the job of the State of New Jersey, and they were really not going to get involved. And that is why we had—I believe that is why the State really has not determined whether or not it can be done.

I would like to add one minor point. The State of Pennsylvania is not the only ultimate destination for the sewage sludge. We are committed to get out of the ocean, if we have to take it to Arizona. That is where we will take it, no matter what the cost may be.

Mr. Hughes. Well, we know Pennsylvania does not want it. New York surely does not want it; they have enough of their own.

And I can understand why the Environmental Protection Agent is concerned about taking a look at your long-term plans, because if you develop interim solutions that depend upon trucking it to Ohio or Pennsylvania, and that becomes foreclosed, and you are out of the ocean, then you are going to have a pretty high pile of sewage sludge in your communities. Because I am not sure where you go from there. Nassau does not want it, they have told us.

Mr. Deieso. Congressman, again, as in solid waste, as those States sequentially close their doors, you move west and you move south. There are landfills in South Carolina; there are landfills in West Virginia; there are landfills in Montana, all of whom are offering very, very inexpensive disposal costs.

The issue of course then becomes the transportation. So I do not want this committee to feel uncomfortable, that in 1992, when Pennsylvania closes its doors, legally to us, that there are no opportunities for disposal in other States. There are.

Mr. Hughes. Well, I would be more assured, Commissioner, if——

Mr. Foglietta. Would the gentleman yield.

Mr. Hughes. I would be happy to yield to my colleague from Pennsylvania, the distinguished Chairman of the Oversight Subcommittee.

Mr. Foglietta. It seems to me from the parts of these questions and answers that I am hearing, is that for some reason New Jersey is determined to dispose of sludge in the landfills rather than to find some alternative method of disposing of it. Why are you so determined not to find the alternative methods and to insist on dumping either in Pennsylvania, or in the South or the West, or anywhere else?

Mr. Deieso. Mr. Chairman, I am sorry you missed some of the opening remarks. Quite to the contrary. We are determined that each of our six authorities, that today produce 50 percent of our sludge, have their own stand-alone, in-State solutions, which is why we are holding them to the fire for all of the long-term plans that they have offered.

And they typically have offered incineration that will begin operating as early as 1992 and 1993, and as distant as 1995. That is the commitment. That is going to be the long-term security and solution. In-State incinerators owned by and run by these six authorities.

The dependence on out-of-State disposal is a short-term one, one that we need to wean away from, but one that today will get us out of the ocean by 1991.

So, we think it is a prudent, reasonable compromise, relying on out of State for a period of time, then weaned out of that option onto the in-State solution for the long term.

Mr. FOGLIETTA. I know I did not hear the answers to all of the questions this afternoon, but earlier, we asked the gentleman from EPA whether or not he thought that the requirements of the Act, requiring that the alternative methods be submitted by 1991 was sufficient time. Why is it that New Jersey seems to need a lot more time than other States may need?

Mr. DEIESO. We, and our six authorities—more accurately, our six authorities have provided the plans by which they will get out of the ocean, by March 17th of 1991, which is the State mandate, not the Federal mandate. They will do so. They will do so by five of them disposing out-of-state, and one of them disposing in State, at an in-state landfill. They will comply with the deadline. They will be out of the ocean by 1991.

Mr. FOGLIETTA. You are saying that the 1991 deadline is not sufficient time to develop alternative methods?

Mr. DEIESO. It is not sufficient time to develop the permanent long-term solution that will be sustained over 25 years. No. We do have, though, the advantage with the out-of-state option, that will get us out of the ocean, during which time the long term, 25-30 year projects are brought on line.

Mr. FOGLIETTA. Thank you.

Mr. HUGHES. I just have one more question.

Mr. FOGLIETTA. I thank the gentleman for yielding.

Mr. HUGHES. I thank the gentleman. I also thank the gentleman for permitting me to read from portions of a letter that the gentleman received from the Commonwealth of Pennsylvania.

I would be assured, if you were to tell me, that the State of New Jersey is now seriously working with our municipal utilities authorities in developing land-based alternatives. I mean, actively working. Because my perception has been the State has been part of the problem.

Mr. DEIESO. I would like to believe, Congressman, a misperception. We have, in the context of the last year—we meet at least bimonthly with the six authorities with the task force that has been noted.

We simply could not be more cooperative and coincident in our views. We are all pulling in the same direction. We would like both the interim and the permanent to be in place as quickly as possible.

Mr. HUGHES. But these authorities are going to need assistance in identifying sites and moving it through the regulatory process. We need to develop alternatives. We have a lot of political problems but we have also had a lot of bureaucratic problems in years past, and the utilities authorities have received a lot of different signals over the years, and as to what direction they should take.

Are you telling me that everybody is working in the same direction now, not only to try to get them out of the ocean with interim solutions, but also assisting them in the regulatory process in identifying alternatives?

Mr. DEIESO. Your point about the past is well-taken. We started sludge incineration initiatives back, as you well remember, in the early 1980's, and then it dropped, and it was picked up, and it was dropped again.

Mr. HUGHES. I know. I have been with it for longer than that. I put four kids through college on ocean dumping alone, as I often say.

Mr. DEIESO. I would like to believe, Congressman—in response to your question—that there is a new spirit. The spirit is born from the fact that there is a Federal statute, and deadlines and penalties, and all of the tools that you provided in that statute.

So my characterization is one of cooperation, moving through. I would like to say, as my colleague from Passaic grabs for the microphone, his characterization is the same.

Mr. LIPKE. As much as I dislike to, I must agree with Don Deieso, that the State has been of great assistance. They have met with us any time we asked them to in formulating the air-pollution control permits, which we hope to submit to them in a number of months for the long-term alterative. But I must say one other thing. The schedule to get out by 1991 requires a tremendous amount of construction work and design work in a very short time period, and we once again ask that the State expedite our reviews of our plans and specifications so that we can meet——

Mr. HUGHES. Well, I hear you and I know that the lead-time is not what it should be, but, I am not entirely sympathetic because you have been on notice since 1977 that we want you out of the ocean. That is 12 years ago.

Mr. Marsh, let me ask you this. From the vantage point of the State of New York, are you directly involved, from the perspective of the State of New York, with New York City in attempting to develop land-based alternatives also? Are you directly involved in that process?

Mr. MARSH. Yes. At the request of Governor Cuomo, we set up a sludge task forth within my department, which I chair, which meets monthly and reviews progress. We have a team of people who are involved in the negotiations of the enforcement orders, and meet with the city, and with the two counties on resolving technical questions and procedural questions on a frequent basis. So we are trying to clear the path as much as possible, the resolution of any issues that can come up, whether they are procedural or technical, or what have you, in the way of their meeting their obligations under the Act.

Mr. HUGHES. Well, I am assured, Mr. Chairman. I know my time is up, but I just hope that it is not a "slip and slide" process whereby we just rely entirely upon requests for proposals, but that we are seriously attempting to get out of the ocean. And it is going to require the support of the State, and working with the city, which has a mammoth job—as you well know better than most—in attempting to develop land-based alternatives.

And I am just hopeful that the State works very directly with the city in making sure that this process moves forward. Thank you. Thank you, Mr. Chairman.

Mr. Pallone. The gentleman from New York. Mr. Manton.

Mr. Manton. Thank you, Mr. Chairman. I want to compliment the panelists from the State of New Jersey for pledging that in spite of perhaps some legal difficulties with the EPA, they will be out of the ocean—not by December 31st, 1991, but March 17th, 1991. And in New York City, we are going to have a parade that day to celebrate New Jersey's being out of the ocean.

[Laughter.]

Mr. Deieso. It is Saint Patrick's Day.

[Laughter.]

Mr. Manton. And Saint Patrick will get his recognition as well. Mr. Lipke, you indicated that the sludge disposal budget will make up $50 million out of what is now a total budget for your authority of some $62 million?

Mr. Lipke. That is correct.

Mr. Manton. Resulting in an 80-percent increase in sewer rates. The question is, after the state-of-the-art incinerator that you are going to build in Newark is constructed, will those rates still be in that 80-percent range, or will you be able to bring them down because of eliminating your interim land-based alternatives, such as trucking to Arizona, or wherever you will have to go by that time, if you are still in the landfill business?

Mr. Lipke. Well, we estimate that the annual cost will probably drop into the $35 million to $40 million a year range. It is still substantial but it is somewhat less.

Mr. Manton. Thank you. New York City I think has taken a bit of a bashing over the last couple of years here, maybe rightly so, but I believe now that we have the ban on ocean dumping in effect on a Federal level, New York City has moved along pretty smartly. They have already budgeted some $40 million toward finding a rational plan to be out of the ocean. I do not wish to be overly optimistic—but on the other hand, perhaps the city will pursue some avenues that we had not seen before.

I would like to ask Harvey Schultz this question. You know the contractors that are out there, and these various people know we have this deadline—is there any possibility that the New York and New Jersey communities all may get gouged, financially, by the people that are going to be submitting responses to the request for proposals for alternative sludge disposal methods? In effect perhaps creating that force majeure that was referred to by Mr. Fangmann in his Nassau County presentation? And what should we do about it?

Mr. Schultz. That is a very incisive question in my mind. Right now, the City of New York is spending about $18 million a year in expense budget money to get its sludge to the 106-mile site. We testified before Congress last year that our estimates were that that would increase to about $50 million to $60 million, in order to get permanently out of the ocean on the schedule we represented to you as being 1995 and 1998. We have done some calculations as to what it might cost us to get out of the ocean on an interim basis in 1991, again, in advance of receiving proposals from the 151 vendors that have picked up our RFPs on an interim basis.

And our estimates are that the costs could range anywhere from a $100 million to $150 million a year in operating expenses, shy any construction or other development costs that we would do.

Of course all of this goes with the fact that we are spending close to $300 million to build the dewatering facilities which we believe are necessary in any event.

So, we represent to you that, quite out front, we expect—as I think you expected—that it is going to cost us a lot of money to get out of the ocean—a very high price to get out of the ocean. But we are very, very concerned about vendors taking advantage of the ocean disposal law, and EPA's consent orders, and then increasing their prices even higher to extraordinary prices, if not prices which will boggle our minds. And we cannot say that we have seen those prices yet. We will see prices in the time frames which I offered to you in the RFP process. We will report the prices to you, but we hope you keep an open mind, and actually talk to EPA about the possibilities that both Jersey and New York City, and all of us, could be faced with some price gouging.

Mr. MANTON. Harvey, it is apparent that a lot of the States are going to be constructing walls around their borders. We heard about Pennsylvania, and perhaps other states, seeking legislation to prevent the disposal of out-of-state sludge. How much, ultimately, if any, of New York sludge do you foresee going out of State, or is it too early to answer that question?

Mr. SCHULTZ. It is really too early to tell, but we have to remember that Congressman Molinari put sort of a wall around the Staten Island landfill. So we are not too confident about all the other elected officials in all the other States waiting for our dewatered sludge trucks. I do not want to take on South Carolina and Arizona. I have my own problems in our own town, as you know.

But we are looking at all of the alternatives. We are taking a different approach, trying to respond to Congressman Hughes' question. We are not contacting landfills directly, but we expect the vendors that have come to us will have arrangements with landfills that they have negotiated on a private basis, at a private price, and we think that the interim solutions will have to be privatizations.

We think on a long-term basis there might be some landfilling solutions for New York City. While we cannot put sludge on the Staten Island landfill we could do some chem fixing, as others have suggested, and if we can meet State requirements, do some soil equivalents for daily or final landfill cover.

We are exploring all of our options on a short-term and a long-term basis, and I am hopeful that we will have some in-city, some New York State, as well as some other kinds of beneficial re-use. The question is, can we all get our sludge into a condition where it will be acceptable wherever we went to sell it, to anybody who can take it?

Mr. MANTON. Thank you. Thank you, Mr. Chairman.

Mr. PALLONE. Thank you. I wanted to ask Mr. Deieso some questions, but before I do that, Don, I have to tell you, very briefly, that I have been reading in the last few weeks about some statements that were made by you, and I just had one quote that is from a newspaper article within the last week.

It says that, "Environmental alarmists, the media, and elected officials are culprits blocking environmental protection."

And it appears that you have been at these different conferences where we are talking about some of the alternatives to sludge dumping, and some of the other environmental protection measures that need to be taken in the next few years.

I hear these kind of words being used over and over again, and I am very concerned about it because I really believe just the opposite.

I believe that there are several reasons why we are at the point where we are today, where we move from the 12-mile site to the 106-mile site, and now we are talking about getting out of the ocean altogether.

In part that is because of elected officials—and I know you praised the three New Jersey members of this committee, so presumably you are not talking about us. But the impression is being given that elected officials are perhaps going too far on environmental protection. Environmental activist groups, I feel very strongly, have a lot to do with the fact that we are this far today. We know that it is through efforts of environmental activist groups in New Jersey, for example, that you have a lot of the legislation on a State level, that is getting us out of the ocean, that is looking for alternatives, that they have been pressuring politicians to some extent.

I see that all as very positive. I see the media's attention to the issue as very positive. And I guess I kind of resent the fact that you have made statements to indicate that those three groups—the elected officials, the environmental groups, the media—are in some way culprits or playing a negative role in all this. Because I do not think we would be here even discussing this legislation today, if it was not for the role that those three groups are playing.

And I wanted you to comment on that, because it is disturbing to me.

Mr. DEIESO. The comments were made, Congressman, but they were not made in the context of sludge and the ocean issues. Let me offer you one illustration, where I think each one of those culprits had a role to play. And it is an ocean issue, and I make a distinction in an alarmist group versus an environmental activist group. In your comments you did not. I do.

An alarmist group is one that would use fear, scare residents into interest on a matter; an activist group has a much higher motive, one of truly protecting public health and the environment. Let me make that distinction.

With an ocean issue as an illustration, we suffered last year headlines in every State paper, multi-State paper, that one could contract AIDS by swimming in the ocean. That notion was developed because five blood vials were found at two locations along 127 miles of coast, and those blood vials tested positive for the antibody, not the virus.

Now the chances of contracting AIDS by swimming in the ocean are zero. Any reputable expert in medical infectious disease transmission did try to communicate that. Headlines, however, read very differently. The alarmist groups would offer a picture that one could contract AIDS by swimming in the ocean. That did the issue a disservice, and it punished our shore as never before.

For those elected officials, or those who aspired to elected office, who used that as an issue and a way to grab attention, my comments were directed, and I will stand by them.

And with respect to that issue, the New Jersey shore became a point of national ridicule over an issue that had absolutely no scientific basis, that could have been completely defused by reporters checking with a Chairman of an infectious disease department at one of the State's hospitals or medical schools. Instead, quoted in newspapers were residents of towns who do not understand bacteria or viruses, and who were quoted as experts because they said we are not bringing our children in the ocean for fear of AIDS.

Now since you posed the question, I carry the next point further—why it is of concern to those of us in the environmental field. Is that every time a resident is unnecessarily alarmed and is scared, the phones that ring off the hook with parents who ask, "Can I bring my child in the ocean?" or "I just had my child swimming; should I bring he, or she in for hepatitis shots?" Each time that happens, like the boy that cried wolf, when we do have an environmental concern these people are not going to believe us. That is the real threat to this field by unnecessarily alarming, and of the alarmists.

Mr. PALLONE. You know, I do not want to take up a lot of the committee's time—although I guess there is not much of the committee left—but my concern is that, as a representative or spokesman for the department, for DEP, that I just think it is inappropriate, or I would hate to see you, or anybody else who is in a high position in the department to be on the offensive, if you will, against those elected officials, media representatives, or even environmental groups that really are trying to do a good job to bring the public's attention to the problems that we face.

Because I mean, somebody else can play that role, but it just seems to me that as far as the department is concerned, the department spokesmen are concerned, that we should all be in this together. Maybe it is a question of degree, but I am just a little concerned about it, and that is why I thought I would bring it to your attention.

Mr. DEIESO. Congressman, we continue to believe that one of the major responsibilities of DEP—and I suggest EPA would feel the same way—is to be the voice of reason and balance, and when there is a scientific mis-fact, and that mis-fact is fueling public opinion, and that public opinion is driving a process called lawmaking or policy-making, there is an obligation for someone to come forward and say, "This isn't true, we're on a wrong track, let's get back to where we should."

And in that sense, we do think it is a responsibility to sound that alarm when we see it is happening.

Mr. PALLONE. All right. Well, I am not going to argue. I would rather see, perhaps, some industry representatives doing that than the environmental representatives.

But in any case, let me get to some questions about the issue at hand. I was concerned, when I asked Mr. Muszynski about the EPA's role in trying to come up with methods. He made a statement that the EPA promotes those alternatives that provide for the beneficial use of sludge, and my understanding of that is that the EPA would encourage recycling, composting, some of the other options in lieu of incineration.

And then he said, "But we can only propose that, we really cannot force anybody, or pressure anybody into doing it."

And I noticed in your statement, you say that, "The department has not been involved in the alternative selection process. New Jersey statutes place the onus of alternative selection on the local level. The department has taken the position that we are able to issue a permit to any selected alternative, provided it meets the requirements under environmental and public health regulations."

Well, first of all, it seems like everybody is passing the buck. The EPA says, well, it is not up to us to tell them not to go the incineration route. Now you are saying it is not up to the New Jersey DEP; it is up to the local.

On the other hand, I heard you say previously, I think, that you were discouraging incineration, or you were trying to encourage some of these alternatives, and that seems to contradict what you say in your written statement. So I just wanted you to comment on that, because again, it just looks like everybody is passing the buck, and the outcome is that every New Jersey authority, except for Middlesex, has gone the incineration route, which I do not think is going to work.

Mr. **Deieso**. Congressman, let me say this. New Jersey and EPA feel that sludge incineration, properly done, properly controlled, is acceptable. We believe that land application of sludge, properly done, regulated, is acceptable, as we do sludge composting.

In fact all three of those technologies are in place in the State of New Jersey today, and these technologies are supported by EPA nationally today. So we express no preference, one or the other. What we do say, and say carefully, is that each of them must be properly designed and regulated, and managed, so that the consequences to the environment are minimized, if not eliminated.

So there is no preference of one or the other. In fact one of the points that was made earlier today is, if that is true, why has ocean dumping of sludge been so popular, and why those using it so reluctant to end, and it is strictly economics. Each of those alternatives will cost more.

Some counties in our State, blessed with a lot of land, can afford composting, can afford land application. An Essex, or a Passaic County, or a Union County is going to have difficulty finding enough land within which to compost any of the sludge.

Mr. **Pallone**. But why not, though, Don? Why don't you promote beneficial-use alternatives? I mean, that is the ideal, and I frankly feel that if everyone ends up incinerating there is going to be so much opposition we are going to end up back in the ocean.

Mr. **Deieso**. One of the burdens that the six authorities carried, in that they are using public money for the construction of this new alternative, was that they would take minimal risks, risks with a technology that may or may not work, and while, again, sludge composting sounds attractive as one, one needs to dispose of the compost after you have finished it. Even if you had the land necessary to do so, the finished product must then either be sold or given away, and I could name for you at least one facility in this country that is producing sludge compost of high quality, and they literally cannot give it away. There is just no use for it as an end product.

So that is a concern that must weigh heavily. Next, with land application, if not properly done, and if the land is not selected in a proper fashion, there may be some severe environmental consequence.

Several of the investigators at Cook College of Rutgers, under contract to us, are looking at the uptake of some of the materials in sludge into crops, even feed crops. It is possible that these materials may be passed on in the food chain. So that, too, is a consequence we need to be very careful about.

And you have heard mentioned here today copper as one of the heavy metals. Well, that copper is not from industrial discharges; it comes from the copper pipes that we have in all of our distribution systems, in homes and in dwellings. So that becomes an important issue, too.

So, I think in fairness, all of the alternatives are acceptable to us if they are properly designed and operated. Each of them pose a unique environmental consequence that needs to be addressed. There is no single one that magically surfaces, money aside, as the single cure that we should all rally around.

Mr. PALLONE. There are a number of problems with incineration. First of all, how are you going to meet the air-quality standards. And we talked before, when Mr. Muszynski was here, and he said that, on the Federal level, that—well, first of all, my critique about the fact that there are no quality standards for sludge dumping, and then his statement, "Well, we don't really need it because we're going to be out of the ocean, and they're going to meet the land-based criteria."

But I mean, are we at that stage? I know that there was a bill passed on the State level—in fact I sponsored it—that required pretreatment, and required that the land-based disposal criteria be met.

Where are we with that?

Mr. DEIESO. You were absolutely on the money when you sponsored that back home, and equally right in making the point now. Pretreatment needs a kick; it is a kick that is long overdue.

The distinction I would make for you, though, is that pretreatment is not going to be that key that opens up all of these alternatives and makes the public embrace them, and make the environmental consequences go away. It is a necessary step, one that will have a long-term pay-off, "long term" defined as 5 years.

Mr. PALLONE. But are you in the process of promulgating pretreatment standards that will allow you to meet these land-based criteria? Otherwise, how would you possibly incinerate?

Mr. DEIESO. It is actually an interesting twist. The sludge that is produced, and its quality, will be dictated by the disposal alternative. For instance, as you noted in the bill that you sponsored back in our State: If that sludge is to be incinerated, it may require that it be less clean than a sludge that is going to be applied to land on which feed crops will be grown.

So I offer that as a hypothetical instance, to show that the end use of the sludge does dictate its quality. Now, to require a sludge to be ultra-pure will mean that all of the wastewater from industry discharged to the treatment plant will have to be highly treated with increased cost.

If that sludge that is now this—for the sake of discussion—ultra-pure quality, is then incinerated, one could argue that all of the money spent in the waster-water systems, up line, by industry, to produce this ultra-pure sludge, have been for naught, and it literally goes up in smoke.

So that concept is one that I think Bill Muszynski was trying to offer you, and one that I try to now. The end product and use of that sludge is connected with its quality.

Mr. **Pallone**. But then we go back to the same point which is that given public opposition to incineration, that some of these other re-use alternatives certainly make more sense, and that if we do not put pretreatment into effect, if we do not have ocean-water quality standards, or criteria for dumping in the ocean, there is no incentive to come up with these alternatives.

What is the State doing? Just tell me, what is the State doing to meet the parameters of that pretreatment bill?

Mr. **Deieso**. Well, the program that we have initiated is giving the pretreatment program a kick, and the authorities will testify, I am sure, as to the measures they are taking.

The moment of truth is going to come when these six authorities, if they move to incineration, come to us with their air-pollution permits, and we find that their emission of metals, for instance, are too high. They, in turn, are going to have to go back through pretreatment programs to see that their contributing industries reduce the metals so that the resultant sludge can be burned, and can be burned with the air-pollution control——

Mr. **Pallone**. But then does that mean that you are going to wait until they adopt their long-term alternatives before you require them to do meet these new pretreatment criteria?

Mr. **Deieso**. No, and what I would like to do, and——

Mr. **Pallone**. Because I thought there was an ongoing pretreatment program as a result of legislation.

Mr. **Deieso**. There is, and for fear of misleading you, what I would like to do is send you a complete schedule, and a package of all of the pretreatment measures that we have in place, those inspired by your bill and fueled by the appropriation that went with it.

So for fear of letting you think that we are waiting, that is not so. There is quite a bit under way. Shelly.

Mr. **Lipke**. In that same vein, as Don said, the amount of pretreatment that is necessary really depends on the alternative. What we have done at Passaic Valley—we have already sent letters to all of our industrial customers, telling them that because of the land-based alternatives that we are going to adopt, that they should be prepared for future local limits on the amount of heavy metals, or other pollutants that they can send into our system.

Now in order to adopt the local limits—that is not Federal standards—we have to have some point that we are going to aim at, and it is our plan to get the exact emissions from our proposed sludge incinerator. We believe that that incinerator can pass all the air-pollution requirements that are in effect today, but that is really not enough for us.

What we want to try to do is adopt local limits that will further reduce the emissions from the incinerator, and at the same time the other negative with the sludge incinerator is the production of ash, and we are moving forward to make some trial ash, and test that to determine whether there are toxic materials in that ash, and then implement local pretreatment limits to reduce the toxicity of the ash.

Mr. PALLONE. Thank you. I wanted to ask the New York representative just a couple of questions. I know we are running out of time here. But I guess it was Mr. Marsh who noted that the proposed Federal standards for disposal of sewage sludge, in their present form, would have a detrimental impact on the viability of recycling and re-use programs.

I just wondered if you would expand on that, because that seems to go to the heart of what we were just discussing here.

Mr. MARSH. Yes. I could send you the specific comments, Congressman, but basically, there are some—let me back up a little bit. In New York, we spent a great deal of time in this decade, agonizing over land-application criteria for sludge. In fact in the mid-1980's we proposed an 18-month or 2-year moratorium on landfilling until we could figure our what are the appropriate loading limits, especially for heavy metals, that we would allow cumulatively, on a piece of land, before it would have to be shut off from any further application of sludge.

We adopted those limits. We have re-adopted them in slightly more stringent form in our new comprehensive solid waste regulations, just at the end of last year.

The Federal proposals go somewhat beyond those in some of the limits, and perhaps more significantly, interpose a great deal of monitoring and reporting, and other requirements, that may, in a given case, tip the balance in view of their onerousness, away from what we would consider a beneficial re-use toward some disposal technology like incineration.

We are concerned that some of the requirements of these regulations go too far, without any particular environmental benefit, in imposing requirements on land application technology. We would like to see them rationalized, to some extent.

Mr. PALLONE. I understand what you are saying, but I am not sure what can be done about it.

Mr. MARSH. We have talked with EPA. A number of States, through the National Governors Association, have approached EPA to try to work out a number of improvements in the regulations, which would, by the way, put a great many current land application projects throughout the country out of business.

And there is a great concern, not just in the Northeast, with our particular ocean-dumping alternative problem, but everywhere about these regulations. So there has been a notice in the Federal Register, and many of the States have responded. There is an ongoing process.

We have talked with Administrator Reilly directly about it, and expect that something will be done, we hope.

Mr. **Pallone**. Well, you have offered to send us the materials, and I certainly appreciate that.

[The information of Mr. Marsh was not received at time of printing.]

Mr. **Pallone**. It just seems so inconsistent. I mean, on the one hand, Mr. Muszynski says that they want to encourage recycling and re-use; Mr. Deieso said basically the same thing; and yet we have these regulations, from your point of view, that seem to be making it more difficult.

Mr. **Marsh**. Well, our statute in New York requires us to proceed down the hierarchy of preferable waste-management techniques, and it applies to sludge as well as to every other waste. Recycling and re-use, as well as waste reduction, are at the top, so we are obliged to try to seek ways of fostering beneficial re-use, and it is a concern that may be made more difficult for us.

Mr. **Pallone**. Thank you. Mr. Schultz, someone at the last panel mentioned that it is possible that in the case of New York City, 20 percent of the sludge might be out of the ocean by 1991, even a 100 percent by 1992, because of new technologies.

Was that ever explained, what the "new technologies" were?

Mr. **Schultz**. I think that was a misstatement by the person, not intentionally. But it would not be new technology. It would be because we have received interim proposals which we believe to be feasible at this point. At a prior point, we might not have thought they would have been, but we now have done more research, we have our consultants on board, and we may identify vendors who can dispose of our sludge.

So I do not think there are new technologies. The new technologies, whether in the form of deep well oxidation, or in fact incineration, are longer-term options for us. We do not consider them to be interim options.

I would just like to, at great risk, I assume, add my comments to this dialogue. Trying to be totally respectful of the fact that we have an ocean disposal law, and that New York City is totally committed to and guarantees to you that we will take whatever action we can conceivably do to get out of the ocean within the law, or as soon thereafter as we can.

The questions that are being asked today about incineration, beneficial re-use—the questions that were asked to NOAA about their impact on life—are things we commented about before this law was enacted. And we believe that, you know, the sludge should not be looked at from a point of how it should be disposed of.

The sludge has to be made as clean as it possibly can be made, and that is what our industrial pretreatment program is about, and we hope other's is about. Ultimately, we have to reduce the heavy-metal content in our sludge as low as possible. That would be our position, regardless of the option, because whether you put it in the air, or on the ground, or at sea, it will minimize the environmental or public-health impacts that you might have if you do the best job you can.

And we always believed, and we said it in our previous testimony last year, that a comprehensive risk assessment ought to be done. We should look at our various options, all of the options, but we should make the best choices from an environmental, health, and cost-effective point of view.

However, we are faced with a lot of requirements, so a lot of the responses I believe you are getting today are,"We are doing the most expedient thing we can do, of course with conflicting laws, conflicting regulations, conflicting policies about how to dispose of waste, and we are struggling to meet the mandate." So that is why, I think you hear as much confusion as seems to be coming from everybody, because they are trying to be helpful.

Mr. **Pallone**. No, I understand, and let me just conclude—because it is almost 6:00 o'clock—that the reason I raised the issue of incineration, in part, because so many of the New Jersey authorities seem to be moving in that direction, is because of the political realities.

And the bottom line is there has been tremendous opposition to ocean dumping, rightly so, and I just do not want to see the alternative—you know—of 90 or a 100 percent of the material be incineration, because I think that that could lead to just as much opposition, and possibly even getting us back into the ocean.

So that the re-use options, whether they be recycling, or composting, or some of the other things we have discussed, I think are much more salable, if you will, to the public, as well as making more sense from an environmental point of view, and that is why I think those should be encouraged.

I just want to thank the panel for being here today. Again, I think it was very instructive, and we appreciate your participation, and we will be continuing tomorrow at 10:00 o'clock with additional panels. Thank you.

[Whereupon, at 5:52 p.m., the subcommittees adjourned, to reconvene on Wednesday, May 17, 1989 at 10:00 o'clock a.m.]

TITLE I OF THE OCEAN DUMPING BAN ACT OF 1988

WEDNESDAY, MAY 17, 1989

House of Representatives, Subcommittee on Oversight and Investigations, Subcommittee on Fisheries and Wildlife Conservation and the Environment, Subcommittee on Oceanography and the Great Lakes, Committee on Merchant Marine and Fisheries,
Washington, DC.

The subcommittees met, pursuant to adjournment, at 10:10 a.m., in Room 1334, Longworth House Office Building, the Honorable Dennis M. Hertel (Chairman, Subcommittee on Oceanography and the Great Lakes) presiding.

Members present: Representatives Hertel, Hughes, Foglietta, Carper, Bennett, Brennan, Hochbrueckner, Pallone, Lowey, Lent, and Schneider.

Staff present: Phil Rotondi, Joan Bondareff, Nancy Tyson, Lisa Pittman, Peter Marx, Tom Kitsos, Kurt Oxley, Chris Dollase, Mike Haas, and Brook Ball.

STATEMENT OF HON. DENNIS M. HERTEL, A U.S. REPRESENTATIVE FROM MICHIGAN, AND CHAIRMAN, SUBCOMMITTEE ON OCEANOGRAPHY AND THE GREAT LAKES

Mr. **Hertel**. The subcommittee will come to order.

This morning, we are continuing our hearing on Title I of Public Law 100-688, the Ocean Dumping Ban Act of 1988. We will be receiving additional testimony on implementation of the Act and taking a look at some of the innovative technological alternatives to the ocean dumping of sewage sludge.

Originally, we had scheduled two panels of record for this morning. However, two of our invited guests could not make it. So I would like to bring everyone forward as one panel.

Ms. Sally Lentz, Mr. David Greenhut, John White, Alex Fassbender, Dennis Cossey, Ernest Kollitides, and Ms. Lynne Edgerton. I would like to begin with you, Ms. Edgerton, when you are ready, and we will end with you, Ms. Lentz. Of course your full statements will be entered in the record. I would like you to please summarize your remarks, and to limit yourselves to five minutes so that we can finish all of the witnesses today.

STATEMENT OF LYNNE EDGERTON, ESQUIRE, COASTAL PROTECTION ATTORNEY, NATURAL RESOURCES DEFENSE COUNCIL

Ms. **Edgerton**. Mr. Chairman, members of the committee, thank you for asking the Natural Resources Defense Council to testify today. Before I move into my statement, I would like to respond to a couple of questions raised in the line of questioning presented yesterday by Representative Pallone.

Basically, his concern was—when he was asking EPA Administrator Muszynski—is what is the EPA doing in its implementation of the Ocean Dumping Ban Act to be sure, or to increase the likelihood that the sludge can be disposed of safely on land when we get out of the ocean.

Now Mr. Muszynski did not seem to have anything in mind. I think he did say that they were looking at increasing pretreatment enforcement, but that that would take a long time.

Now NRDC has answered this by arguing that EPA should require reduced toxicity in the sludge over time, as part of the compliance and enforcement agreements. That means that it would have the benefit of improving the quality of the ocean right now as the toxins were reduced, and it would also increase the likelihood that this sludge would ultimately be of a quality, that it could be disposed of on land.

Any land-disposal option, as we all know, will be simpler if the sludge is cleaner. We have also sent letters, last summer, and argued in the hearings on the proposed permits to ocean dump, that the EPA, Region II, should adopt an interim strategy for cleaning up the sludge while it is being ocean dumped.

Essentially what we have said is that under the Clean Water Act, the EPA has the authority, in the NPDES permits for the municipal treatment plants, to impose criteria and local limits to reduce the toxicity of the sludge. We say EPA should do it, and do it now.

In fact we have sued the New York State Department of Environmental Conservation in State court for failure to hold a hearing on their doing the precise same thing, and we have also asked EPA, Region II, to add a rider to the NPDES permits, in order to achieve the local limits that we think are necessary to clean up the sludge in New York.

We have also asked EPA, Region II, to approach the implementation of the Ocean Dumping Ban Act as an opportunity to implement an integrated strategy for managing the transition from ocean dumping to land-based alternatives.

The EPA is not only charged with implementing the Ocean Dumping Ban Act. The EPA is also charged with implementing the Clean Water Act. The EPA is also charged with implementing the Clean Air Act.

We have a lot of difficulty seeing how the EPA Administrator for Region II can approve a land-based alternative plan that EPA Region II is not satisfied complies with the Clean Air Act, for example. It does not seem to us that you wait until later to find out that, whoops, the incinerator in New Jersey does not happen to comply with Clean Air Act requirements. It is all an integrated strategy, and we think that this bill that was passed last year gives EPA the power to do just that.

We also think that the EPA, under law, has to either begin now to redesignate the 106-mile site past March 17th, 1991, or, has to try to designate a new site farther out, because the law, as it is currently written, only authorizes dumping at that site until March 17th, 1991.

EPA has said they are going to get a consent agreement from a court. I have difficulty understanding how a court is going to authorize and approve dumping which is in violation of law. So I think that is something that they need to look at.

We think the EPA should get aggressive, it should roll up its sleeves, and it should search hard for the best land-based solutions. EPA I think has made an impressive effort, actually, in terms of the enormity of the problem, to try to get things moving in this very difficult area, and I do not suggest that there is any easy answer, or any single answer. But we do suggest that EPA make an independent analysis of the land-based alternatives, and one that will insure that the alternatives do not violate other statutes.

We have also suggested to EPA—we did in February of this year—that EPA Region II convene a roundtable discussion of land-based alternatives. So that companies, such as are here represented, can come and interact with environmental groups, with citizens, with the communities that are dumping, so that the process of finding the best solution can be advanced.

While I am respectful of the fact that Mr. Schultz has said that he does not want to negotiate what New York City is going to do in the press, and while I am respectful of the fact that it is sometimes tricky to have all this in the public, it is nonetheless very important for New Jersey to know—for example—that New York State is inclined to deeply oppose incineration, new incineration in New Jersey, particularly since New Jersey presently plans to build—as was quoted in the press—the world's largest sludge incinerator.

So this is important, and this is also important in terms of informing the public of what the options are, so the public can understand where we are going. One other idea I had is maybe Congress could initiate a study on what would be the best land-based alternatives.

Today, I was asked to talk about perhaps the most far-reaching and difficult problem facing the committee and the Congress. What is the most environmentally acceptable and cost-efficient solution for this sludge? That, after all, is the question. We have decided it should not be in the ocean, and now we have to decide where it is going to go.

Unfortunately, I cannot come before you today and say that NRDC has done a complete in-depth analysis of all of the options, and that there is a clear winner. We are monitoring them. I have spoken with some of the individuals here, I have spoken with a lot of other individuals, but, unfortunately, I cannot do that. But what is truly unfortunate is that neither can EPA, neither can New York City, neither can New Jersey.

And these plans are supposed to be approved by August 14th. So, I ask the Congress to consider initiating its own effort to monitor or investigate this process so that what Mr. Pallone suggested might happen does not happen. Namely, that the dumping stops in the ocean, and there is such an uproar about the alternatives that are accepted, that we fail to advance in terms of managing the overall problem.

What we are talking about here is cross-media transfer of pollution. This is something we used to talk a lot about in the 1970's, and this is something we understand again, now. It could be called "what goes round comes round," or "nothing ever goes away." Basically, it is that we do have to approach this from an overall point of view, so that we can find a solution.

The environmental community—and I am speaking for the environmental community—prefers beneficial re-use, source reduction. These are the same things that the Clean Water Act sets out as the goals of the Clean Water Act. This is what New York State prefers. This is what New Jersey said they prefer, and this is what the environmental community very strongly prefers.

The New Jersey plan for incineration is troubling, for a variety of reasons. Perhaps the major one is that the incineration that is proposed to occur will occur in an area that really cannot stand another major point source of pollution, or at least we have grave reservations about further degrading the regional air quality.

Secondly, a commitment to one single source, incineration, one single solution, excludes any opportunity to re-use this material. It also, to some degree, takes away the pressure for reduction at the source. These goals are very important goals of the Nation.

The other concern that we have about it is best expressed by a chart that I saw presented at the New York Academy of Science by a gentleman who was unable to come today, but who works up at Cornell. He had a nice chart that showed a sewage treatment plant, and it showed what happens if it then goes into an incinerator, and then it spews the heavy metals and the contaminants into the air, which then are dispersed either onto the ground, or to the ocean. Then, if you get the scrubbers and if you try to collect that material, then it has got to be retreated so it can be safely land-disposed.

Now in the in-between, what has happened? We have spent a great deal of money building these plants, and we finally have got to dispose of the material anyway. Why not skip that step? That is a question I think we need to answer.

Now I do not know how much time I have. I think I have probably said all that I have to say, but I want to compliment the committee for having this hearing, and for advancing the search for land-based alternatives, and for innovative technologies, and for rolling up its sleeves, working on this, and I am very eager to hear what the other members of the committee have to say. By the way, I should say that Ms. Lentz is presenting testimony also on behalf of the Natural Resources Defense Council, and her testimony focuses on sort of the "nuts and bolts" of the implementation of the Ocean Dumping Ban Act rather than on what are we going to do with this sludge on land. Thank you.

[The statement of Ms. Edgerton can be found at end of hearing.]

Mr. HERTEL. Next we have Mr. David Greenhut, and after him, John White.

STATEMENT OF DAVID GREENHUT, DIRECTOR OF MARKETING AND NEW PRODUCT DEVELOPMENT, KUBOTA AMERICA CORPORATION

Mr. **Greenhut**. I would like to thank the Subcommittees on Oceanography, Oversight and Investigations, and Fisheries and Wildlife Conservation for inviting me to present an alternative technology for the disposal of sewage sludge. I am a director of Kubota America Corporation which is a wholly-owned subsidiary of Kubota, Limited, with headquarters in Osaka, Japan.

Our research group in Japan were pioneers in developing the technology of sludge vitrification which is now accepted in Japan as a viable alternative to existing sludge management practices.

This technology and associated equipment has been transferred to Kubota America Corporation which is now making it available for use throughout the United States.

The concept of sludge vitrification is to perceive sewage sludge as a base material for the production of an amorphous glass-like silicate aggregate which in turn is used in the production of ceramic tiles, cinder blocks, ground cover, drainage fill, and in asphaltic and cement mixes.

The Kubota melting furnace has been designed to product this aggregate material in a consistent and pure form, regardless of the variation of sludge composition.

The aggregate, although it contains the normal metals found in typical sewage sludge, is non-leeching and inert. This allows this material to be used on a stand-alone basis without the need for any encapsulation or further processing.

The Japanese Ministry of Construction and Tokyo Metropolitan Government have approved the material for use as a substitute for landfill sand, improving agent for poor drainage land, anti-water penetrant agent for tennis courts and playgrounds, pavement material for light-loaded roads, and a bedding for pipes.

Here in the U.S., the New Jersey Department of Transportation has conducted chemical tests, and has found the material chemically stable. We are currently undertaking physical testing to determine how to best incorporate this material into the existing State regulations.

To fully understand what is meant by "vitrification," it is important to understand the nature of sludge and the Kabota melting furnace. Sludge is basically composed of three major categories of material: water, organics and inorganics. Water is removed from the sludge by mechanical dewatering and drying, leaving the organics and inorganics behind, which is then fed into the melting furnace.

The furnace, which operates at 2500 degrees Fahrenheit, causes the organic material to break down and gasify by pyrolysis. At this temperature, no organic material can survive and the organics will be disassociated into their elemental form, whereupon they combine with oxygen giving off heat.

This heat maintains the primary chamber at the high temperature and causes the remaining inorganic material to form a liquid. The liquefied inorganics are then quenched or air-cooled forming the vitrified aggregate.

Sludge volume reduction is maximized since any organic material in the sludge is completely reacted, and the inorganics converted into a densified slag. For a typical sludge cake at 80 percent moisture, approximately 50 tons will be transformed into one and one-half yards of slag.

The Kabota melting furnace has been under development commercially since 1976. The Japanese sewage agency operated by themselves a pilot plant for 3 years, between 1979 and 1982, in order to study vitrification. After their review and publication of their data in 1983, they have accepted and promoted the use of vitrification for the processing of sewage sludge.

We have developed this system in order to be able to recycle the sludge cake without worrying how much of any particular element it contains. Once the vitrified slag is produced, it is safe and inert, without concern for the sludge quality used to produce it.

This system has been reviewed by the New York State Department of Environmental Conservation, Bureau of Waste Reduction and Recycling, and they have found, and I quote: "The Kubota system would be included within the category of recycling and/or re-use of waste." Unquote.

The vitrified material would also lend itself to re-use within the community in which it was generated. This would give the community, or plant operator the ability to control the process from beginning to end without worry about interstate legislation and its effect on the distribution of their final product.

On February 6th, 1989, the Environmental Protection Agency issued a proposed standard for the disposal of sewage sludge, 40 CFR, parts 257 and 503. A portion of these standards deal with the air emission requirements for sludge incineration. These standards were not intended for vitrification and vitrification is not incineration. However, they do address the quality of emissions that should be achieved by a sludge disposal system.

We have reviewed these standards and the plant we are currently building in Monticello, New York will have cleaner emissions and exceed these standards. The vitrification technology, although capital-equipment intensive, is comparable in overall cost to other sludge disposal systems, when you consider that the other systems will have to be improved to meet the new proposed guidelines for air emissions and for distribution.

For a 100 tons of cake per day at 80 percent moisture, we project operating and maintenance costs to be $35 a ton. Amortization costs for the plant can double this figure, depending upon interest rates and tax treatment. These projections do not include any income which may be derived after proper marketing of the vitrified material. With proper governmental support and encouragement to re-use this material, we can expect a dramatic effect on final costs.

To summarize, I would like to offer the following points. One, vitrification is a proven form of recycling sewage sludge. Two, the vitrification system can meet all existing and proposed regulations for sludge processing systems. Three, multiple uses can be found for the vitrified sludge. Four, this technology is available on a full-scale basis today. Finally, vitrification, although on the upper end of the scale, is cost competitive with other technologies. We believe that vitrification will become an important technology for the treatment of sewage sludge in the near future, and appreciate having this opportunity to bring this technology to the attention of these joint committee.

Thank you.

[The statement of Mr. Greenhut can be found at end of hearing.]

Mr. HERTEL. Thank you. Next we have Mr. John White.

STATEMENT OF JOHN WHITE, OXIDYNE CORPORATION, ACCOMPANIED BY JAMES ELLER, SENIOR VICE PRESIDENT, ENGINEERING DIVISION, OXIDYNE CORPORATION

Mr. WHITE. Thank you, Mr. Chairman, subcommittee members. Mr. Davis asked me to express his regrets that he could not come today, but he has sickness in the family.

We very much appreciate this opportunity of appearing before the subcommittees to present a very brief description of our patented and proprietary deepwell wet oxidation process. I am just going to hit the highlights of our prepared statement.

Mr. Jim Eller is accompanying me today and he is Senior Vice President for Research and Engineering, and will be in a position to answer technical questions, if you have them, at the end.

In addition, I have left two reports with your staff members, prepared by Dr. Earnest Gloyna at the University of Texas. Dr. Gloyna, until recently, was dean of engineering, was dean for UT for about 17 years. He now heads up a research program. He has prepared a supplemental paper that we would like to have included in the record, and I have made those copies available.

Mr. HERTEL. It will be included in the record.

[The information of Dr. Gloyna may be found at end of hearing.]

Mr. WHITE. Thank you. And I should add that Dr. Gloyna and his research people are doing research in the supercritical wet oxidation process area, and Oxidyne is funding that to a degree.

The Oxidyne system is based upon the use of a vertical main process vessel that is suspended up to a mile deep within a conventionally drilled and double-cased well.

This process vessel provides the pressure and temperature controlled environment needed for a continuous flow of wet oxidation process.

These process vessels may be constructed to provide both the temperature and pressure needed for subcritical or supercritical water conditions. Water is brought to a supercritical condition at pressures above 3,200 pounds per square inch, and temperatures above 705 degrees Fahrenheit.

Oxidyne's systems may be used to provide treatment for a wide range of waste materials that include municipal wastewater treatment sludges; industrial sludges; high-strength organic wastes; and slurried solid hazardous waste.

The overall subcritical Oxidyne system, when treating a municipal sludge, is designed to achieve up to 90 percent reduction of chemical oxygen demand, 95 percent removal of total suspended solids, and 98 percent reduction in volatile solids. The sterile, nonhazardous ash from our process has excellent settling and dewatering characteristics.

The water byproduct may be returned to the waste-water treatment plant for further treatment and discharge. The ash may be used as an additive for concrete blocks, roadbed material, asphalt, and concrete surface material because of its non-leachable, inert quality; or it may be disposed of in a conventional sanitary landfill.

The supercritical system, when fully developed by Oxidyne, will provide a greater degree of destruction of organic wastes at a much higher throughput. Both systems will sufficiently oxidize heavy metals to the point that they will pass the EPA's leachate tests.

I would like to emphasize that deepwell wet oxidation is not new technology but is an innovative approach to a proven wet oxidation technology. A controlled environment is provided by utilizing oil field technology and standard industrial practices, equipment, and materials.

The Oxidyne process combines these elements to destroy, not store, waste-water treatment sludges and other organic wastes.

In closing, I wish to point out that we believe that deepwell wet oxidation technology will prove to be the most environmentally sound system available today. There is no discharge to the underground environment. The minimal air discharge is small amounts of carbon dioxide. Process water is returned for final treatment to the waste-water treatment plant, and the inert ash may become a useful byproduct. In brief, the result is final treatment and disposal.

Thank you for the opportunity of being here.

[The statement of Mr. Davis can be found at end of hearing.]

Mr. HERTEL. Thank you very much, Mr. White. Mr. Alex Fassbender.

STATEMENT OF ALEX FASSBENDER, MANAGER OF TECHNOLOGY COMMERCIALIZATION, PACIFIC NORTHWEST LABORATORY, U.S. DEPARTMENT OF ENERGY, BATTELLE MEMORIAL INSTITUTE

Mr. FASSBENDER. Good morning, Mr. Chairman, members of the Merchant Marine and Fisheries Committee, and colleagues. My name is Alex Fassbender. I am the Manager of Technology Commercialization at the Department of Energy's Pacific Northwest Laboratory operated by Battelle Memorial Institute. Battelle and I sincerely appreciate your interest and the opportunity to discuss the Sludge-To-Oil Reactor System, and the practicality and feasibility of technological alternatives to ocean dumping of sewage sludge.

Yesterday, we heard a lot of testimony from the Coast Guard and EPA, and New York and New Jersey, talking about the difficulties of getting out of the ocean, and the pinch between legal and regulatory constraints on one side, and physical and financial constraints on the other.

A sewage treatment plant, as we all know, never gets a recess or a holiday. The Sludge-To-Oil Reactor System, is a new technology which produces more energy than it consumes, precipitates and removes heavy metals from the sludge, destroys or concentrates toxic organics, requires only a small amount of space and eliminates the need for anaerobic digesters.

The technology addresses many of the physical and financial constraints of sewage sludge disposal. It is based on 10 years of basic research funded by the Department of Energy, 3 years of applied research, and one pilot plant research effort supported by the Environmental Protection Agency and private industry.

We are in the process of constructing a second-generation pilot plant. The Sludge-To-Oil Reactor System was given a "Research and Development Magazine" award, an R&D 100 award for being one of the most significant new technologies in the year 1988.

The STORS process does not vaporize the water in sludge and it is thermodynamically superior to any fuel-based process that does vaporize the water in sludge. It converts the organics in the sludge into an oil while under pressure to prevent the water from boiling.

The oil product is insoluble in the remaining water. It has a heating value of 80 to 90 percent that of diesel oil. The separation of the oil from the water occurs naturally, spontaneously, like oil and vinegar salad dressing.

This greatly simplifies downstream processing, and allows STORS to generate more useful energy in the form of oil than it requires. The thermodynamics of the process can stabilize the cost of sewage sludge disposal in the face of rising fuel costs, and enhance our Nation's energy independence.

One of the other products, besides the oil that is formed, is a char, which contains up to 60 percent of the inorganic ash that is originally present in the sludge. The hydroxide, oxide, and carbonate salts of most heavy metals are relatively insoluble, and in the process, they are precipitated from solution. Chromium is concentrated about twofold, copper four to sixfold, zinc two to fourfold, and lead three to sixfold.

The heavy metal hydroxide, oxide and carbonate salts are readily fixed in a stable matrix when mixed with a concrete grout, and thus, STORS removes the heavy metals in a form ready for ultimate disposal.

The waste water coming from STORS, separated from the oil, can be further treated by a biological or chemical means to acceptable levels.

One aspect of the STORS process deals with its ability to handle toxic organics. The process itself destroys some toxic organics. Preliminary laboratory work has demonstrated the destruction of chloroform, lindane, and a 2,4,5-T pesticide analog.

During the oil-water separation, oil-soluble organics are concentrated in the oil. Since the STORS oil has a high heating value and contains only traces of water, it readily burns at much higher temperatures than regular dewatered sludge.

The high-temperature combustion of STORS oil allows for efficient energy recovery, and ensures destruction of the toxic materials. This is especially important for cities such as Bay City, Michigan, and others, which have PCBs or dioxins in their sludge, which requires incineration.

The STORS process is compact and integrates well with existing waste-water treatment facilities. Many treatment facilities are constrained, in physical size, in large cities because communities have grown up around them. STORS requires much less space to do the same job as other technologies.

Although STORS is a new technology and is unproven at commercial scale, its development has been supported by the Department of Energy, EPA, and private industry.

We believe that STORS is a practical, economic and feasible technology for sludge disposal. Thank you.

[*The statement of Mr.* Fassbender can be found at end of hearing.]

Mr. **Hertel.** Thank you. Next we have Mr. Ernest Kollitides.

STATEMENT OF ERNEST A. KOLLITIDES, PRESIDENT, DEHYDRO-TECH CORPORATION

Mr. **Kollitides.** Thank you, Mr. Chairman. Perhaps it is appropriate that we discuss this subject today, because in today's USA Today newspaper, they talk about a poll they took yesterday, and the environmental concern of the people has grown. In 1973 it was 48 percent, and today it is 84 percent. This is for water pollution, the subject we are discussing.

I am Ernest Kollitides, president and chief operating officer of the Dehydro-Tech Corporation. Dehydro-Tech Corporation is grateful for the invitation from the United States House of Representatives, Committee on Merchant Marine and Fisheries, to address your esteemed subcommittee, and to assist you in your challenging quest to clean our environment and improve the quality of our waters, and therefore, our very lifestyle.

Even before the enactment of the Ocean Dumping Ban, Dehydro-Tech Corporation was designing sludge-drying facilities utilizing the patented Carver-Greenfield Process, in the United States and overseas.

Several years ago, the United States EPA designated the Carver-Greenfield Process, quote, "innovative and alternative," unquote, and funded four large projects in the United States. These are commercial-size projects, not pilot plants.

The Carver-Greenfield Process is a very efficient drying process utilizing a multi-effect evaporation system using a light oil as a fluidizing medium. In other words, the sludge is mixed with light oil first.

This system is particularly suitable to drying municipal sewage, industrial and even hazardous sludges.

The light oil used for fluidizing the sludge is recovered and recycled over and over again. The sewage oil—and yes, sludge has a great deal of sewage oil in it—representing 10 to 20 percent of the dry solids in sludge, is separated from the fluidizing oil and solids, and can be used as a fuel to produce energy, including the very steam required to drive the entire process.

The dry solids product may be used as a high-quality fertilizer, free of pathogens or bacteria, and rich in nitrogen and phosphorus. It may also be combusted to produce steam or electricity for other uses, or for sale, to offset the operating cost of the very plant and the process itself.

The Carver-Greenfield Process has a history of more than 30 years, with over 80 installations around the world in diversified applications. Three large facilities are presently under construction in the County of Los Angeles, California, and in Trenton and

Ocean County, New Jersey. The fourth large municipal sludge plant, the Hyperion plant in the City of Los Angeles, is now operational. When it reaches full capacity, this plant will handle the sludge of the waste water of the City of Los Angeles—over 500-million gallons per day—producing in excess of two million gallons of oil derived from sludge, and over 82,000 tons of solids per year. This is *dried* solids! The combination of the sludge oil and the dry sludge solids, plus the methane gas produced in the sludge digesters will generate 220 million kilowatt hours of electricity per year. This is at the City of Los Angeles.

There are three municipal sludge Carver-Greenfield facilities in Japan, in the cities of Tokyo, Fukuchiyama, and Hiroshima. The last two began combusting their dried sludge and producing steam about 15 years ago. The Tokyo plant, which was just commissioned, is combusting its dry sludge to generate electricity.

The Mercer County Improvement Authority communities in New Jersey will be feeding raw sludge to the Carver-Greenfield facility, thereby avoiding the very expensive digester installations.

Further, this plant will be marketing a fertilizer product produced at a very low energy cost. At the same time, the sewage oil extracted from the sludge will be combusted to produce all the steam required for the process and half of the electricity required by the entire facility.

The energy requirement to evaporate water in the Carver-Greenfield Process is less than 400 BTUs per pound of evaporated water, compared to competitive processes requiring 1500 to 2000 BTUs per pound of evaporated water.

In the Ocean County installation, the evaporation energy requirements will be even lower, about 200 BTUs per pound of water evaporated, due to the use of the newer, highly efficient technology called Mechanical Vapor Recompression, which is part of the overall Carver-Greenfield process.

This does not include credit for the extracted sewage oil which will often reduce outside energy requirements to zero.

Since the Carver-Greenfield Process effectively evaporates the water from the sludge, the condensed water is clean, suitable for disposal or for recycling with minimum treatment requirements.

The production of a *dried* powder product minimizes freight costs and extends the marketing potential of the product as a fertilizer or fuel over a wide area. The dry powder can be combusted more efficiently than wet sludge, requiring smaller-volume furnaces, and eliminating boiler-tube corrosion normally associated with high moisture fuels. Also, the resulting higher combustion temperatures assure the complete destruction of any residual toxic materials and other compounds.

A unique feature of the Carver-Greenfield Process is that it removes the sludge oil from the dried sludge, and with it virtually all of the oil-soluble compounds, such as pesticides, herbicides, dioxins, PCBs, cleaning fluids, and many others, which may be in the original sludge. They can then be safely combusted with the sludge oil and destroyed.

Foster Wheeler Corporation is Dehydro-Tech's licensee for large sludge plants in the United States.

In the interest of time, we have attached a copy of our latest brochure to this statement. We believe that the easy-to-read content and pictures give a good understanding of the overall Carver-Greenfield Process, and its suitability to provide environmentally sound and cost-effective solutions to the challenge of municipal sludge management.

Recognizing the important work of this subcommittee, perhaps it would be appropriate to close this brief statement with a quote from President Theodore Roosevelt, in his message to Congress on December 3, 1907. Yes, 1907!

Quote. "To waste, to destroy our natural resources, to skin and exhaust the land instead of using it, so as to increase its usefulness, will result in undermining, in the days of our children, the very prosperity which we ought, by right, to hand down to them, amplified and developed." Unquote.

To the extent that, as a result of this meeting, the subcommittee would have moved a step closer to understanding the true potential of the currently available sludge management technologies, it would have taken an important step in the direction of improving our environment in our lifetime, and for future generations. Thank you very much for this opportunity.

[The statement of Mr. Kollitides can be found at end of hearing.]

Mr. HERTEL. Thank you very much. Next, we will have a statement from Ms. Sally Ann Lentz who is a staff attorney for the Oceanic Society, but she is also testifying on behalf of the Environmental Policy Institute, Friends of the Earth, and Natural Resources Defense Council, and she has with her Boyce Miller who is a staff scientist for the Oceanic Society. Ms. Lentz.

STATEMENT OF SALLY LENTZ, ESQUIRE, STAFF ATTORNEY, OCEANIC SOCIETY, ACCOMPANIED BY BOYCE MILLER, STAFF SCIENTIST, OCEANIC SOCIETY

Ms. LENTZ. Thank you, Mr. Chairman. We are concerned, Mr. Chairman, that the Ocean Dumping Ban Act of 1988, which I will refer to as the Act, is not being implemented properly and in a timely manner, leaving open the real possibility that ocean dumping of sewage sludge will continue to threaten the health of the marine environment on our Eastern seaboard.

As regards compliance and enforcement agreements, the failure of the dumping authorities and EPA to reach agreement represents a major setback and threatens to undermine the intent of Congress to end ocean dumping by December 31st, 1991.

The recent law suit brought by a number of New Jersey municipalities will cause further delays in achieving the necessary agreement. We are concerned that continued delays may jeopardize the public's opportunity to review the agreements as the August 14th deadline approaches.

In addition, the Act requires such agreements as a precondition to the issuance of a permit, yet, on March 24th, EPA issued proposed permits in the absence of such agreements. The agreements and the permits must go hand-in-hand, and should have been issued for public comment simultaneously.

It was difficult to properly analyze the adequacy of the permits without having the agreements in hand.

The remainder of our testimony is devoted to the adequacy of EPA's proposed permits and monitoring program. A detailed analysis of the proposed permits appears in our written statement.

Yesterday, Mr. Muszynski stated that the Act allows EPA to end ocean dumping without determining the fate and effect of that dumping. In the long term, that may be the case; however, as you know, nothing in the Act exempts current or future dumping permits from the requirements of the Marine Protection, Research, and Sanctuaries Act.

Those requirements mandate consideration of fates and effects. The proposed permits fall far short of meeting the requirements of MPRSA. Specifically, the permit applications do not satisfy the applicable environmental impact criteria. They fail to fully consider land-based alternatives, and they fail to adequately consider the impact of the dumping on aesthetic, recreational, and economic values, and other uses of the ocean.

In addition, use of the 106-mile site is environmentally unacceptable, because there is no baseline data available against which to measure potential impacts. Mr. Hughes was right on target yesterday, when he criticized EPA and NOAA for their failure to collect baseline information on the site. In fact it is already too late to develop such a baseline because the area has already been affected by dumping, at the adjacent industrial waste dump site, and the sewage sludge dump site itself.

The absence of a baseline makes it virtually impossible to determine if sludge dumping is causing further damage. In addition to the failure of the proposed permits to satisfy the MPRSA, they also fail to satisfy other Federal environmental laws. These are discussed in detail in our written statement, but I would like to mention, specifically, the Endangered Species Act, because of yesterday's discussions of dolphin deaths.

The Endangered Species Act requires Federal agencies to ensure that their activities are not likely to jeopardize the continued existence of any endangered species. Four species of endangered whales are found in the area potentially influenced by the dumping, as well as 1000s of endangered sea turtles. Yet, the proposed permits are silent on the issue of endangered species, appearing to ignore entirely the Endangered Species Act.

Indeed, a determination that the proposed dumping will not affect these animals is virtually impossible to make because the potential impact is so difficult to predict, and the residence times of marine mammals at the site are not well documented. Given the unusual dolphin deaths of the past summer, EPA's disregard of the Endangered Species Act requirements in relation to these proposed permits, is irresponsible.

Further, a number of the proposed permit conditions are insufficient. Deficiencies relating to discharge rates and procedures, surveillance, and shipriders, among others, are discussed in our written statement.

In sum, EPA's proposed permits do not meet the requirements of the MPRSA, or other Federal laws, and need to be substantially revised.

If EPA insists on continued use of the 106-mile site, then the permits should impose serious restrictions on dumping activities to mitigate potential effects. For example, EPA should prohibit dumping during times when warm-core eddies are expected at the site. The number of vessels operating at the site should be limited to prevent overlapping plumes, and the toxicity of the sludge should be required to be reduced over time.

Our written statement discusses, in detail, the results of the Inspector General's report on EPA's monitoring plan, and we are in general agreement with the findings of the Inspector General.

We are especially concerned about the tiered approach described yesterday by Tudor Davies. The four tiers he described do not logically follow one another. In fact they are categories of research and monitoring that should be conducted simultaneously.

Finally, Oceanic Society staff participated in EPA's March workshop on monitoring. We believe the agency has misrepresented the results of that workshop. There was no consensus among the experts concerning the environmental or human-health effects of sludge dumping.

There was consensus that there exists no information on which to base such a judgment. In fact many of the participants expressed the belief that there is a potential for environmental degradation, and it is essential that monitoring be conducted to determine the nature and extent of that impact.

In conclusion, we are disappointed with the progress made thus far in implementing the Act, though we do look forward to working with you, and other members of the subcommittees, as well as with NOAA and EPA, to achieve more significant progress in the coming months. Thank you.

[The statement of Ms. Lentz can be found at end of hearing.]

Mr. HERTEL. Thank you very much, and I thank the entire panel. We have additional statements that will be submitted for the record, without objection, from several authorities and companies.

The statement of A&S Transportation Company. We have got one from the Middlesex, New Jersey Sewerage Authority. We have an attachment number six to the testimony of the New Jersey Department of Environmental Protection, and a statement of Mr. Dennis Cossey.

[The material mentioned above can be found at end of hearing.]

Mr. HERTEL. At this time we will go to questions from members of the various subcommittees, and Mr. Hughes will be first.

Mr. HUGHES. I came in late, Mr. Chairman, so I will defer to my colleagues.

Mr. HERTEL. Mr. Carper from Delaware.

Mr. CARPER. Thank you very much. Thanks to each of you for appearing before our joint committee today. Let me just ask our friends from the environmental community, if you would care to comment on some of what you have heard here today from people who are working on private-sector initiatives, in some cases with Government support.

What do you make of these technologies that they have been describing? What seem to be their strengths and/or weaknesses?

Ms. LENTZ. Just briefly, I was very encouraged from what I heard today. We have been concerned about the lack of this kind of information being available, not only to congressional committees, but also to the potential ocean dumpers. And we think that the sorts of technologies that are being discussed today hold great promise.

Of course we have not looked at all of the results of the testing, but we are encouraged by the fact that there is some initial indications that the products that are created from these technologies are useful products, that hopefully will not leach toxic contaminants.

Ms. EDGERTON. Well, the NRDC's concern is that we find beneficial use, re-use, and safe disposal. That is highest up on our agenda. Now, to the extent that these technologies that were presented today can achieve those ends, it is quite encouraging.

Our difficulty—and we very much appreciate the committee having these hearings—I cannot do what I think you want me to do, which is give a more concrete analysis to each one of these technologies, because we are not yet prepared to do that.

We have been seeking out information about each technology, so that we are up to speed, and so that we are in a position to, if not endorse, certainly not oppose the ones that we think do achieve our goals. That is a fairly complicated statement. But we want to be a part of the solution, and we recognize that some of these technologies may be part of the solution.

One thing that I did not discuss here in my oral presentation, but which is covered in the written testimony, is the Clean Water Act proposed regulations on disposal of sludge on land, and they have been alluded to today, and they were yesterday, in some detail.

One of our concerns about that is that some of these technologies may, or may not, ultimately, be covered by these proposed regulations, so that is something to be aware of. That these proposals were in part developed without taking a look at, say, for example, vitrification, or some of the other technologies.

But our other concern which—maybe this is the right time to say it—the other concern that we brought out in our written testimony which I think is important——

Mr. CARPER. Excuse me. I am going to ask some other questions. I wanted you to address specifically the question that I have raised, and I can appreciate that you have some other points that you want to make. But I have a limited amount of time, and——

Ms. EDGERTON. Right. Well, the only concern, it does concern the——

Mr. CARPER. If you will, be specific. Thank you.

Ms. EDGERTON. This does concern these, and that is that there is one loophole in the proposed regulations which may encourage cities to exclude these technologies, and that is that the proposed regulations do not, at this time, cover disposal of sludge in municipal landfills.

So in an indirect way, it may encourage cities to dump their contaminated sludge in municipal landfills instead of seek these options.

Mr. CARPER. To our people from the private sector, you have heard these comments, and I would like to hear some responses.

Mr. KOLLITIDES. I can answer some of them.

Mr. **Carper**. Use the microphone, if you will, please. Pull the microphone closer. Thank you.

Mr. **Kollitides**. In the Carver-Greenfield Process, the final product, is absolutely safe in every way possible. The only thing our process does not do—and neither does any process in the world today—is to have a major effect on the heavy metals. For the heavy metals, ultimately, there will be a technology. We are spending a great deal of money in our company, and some of our scientists believe we are close. I think we are maybe moderately close. I am looking at it as a businessman more than simply as a scientist, although I am an engineer by profession.

But there is no technology today that removes heavy metals. However, the Carver-Greenfield Process removes everything else that is unwanted in the sludge, including the sludge oil, which very few processes do; as a matter of fact there is only one additional process that removes it, and then it removes it as a major product. Ours removes it as a byproduct. It is a happy coincident of the process.

Our process leaves open the option, whether we combust the material to produce energy—and by "material" I mean the dried oil-free product which is a gray, granular product. The sludge oil itself can be combusted in safe incinerators to produce the very energy it takes to drive the system.

We do not endorse, at Dehydro-Tech, the use of the material as an asphalt cover because we believe that asphalt can wear out, just like most roads do, and then the very material that comes out in the form of powder is breathable again. Therefore, I do not think our company would endorse that use for our product, or for the product of anybody else, no matter how they get it, as long as there are heavy metals in it; and today, there is no technology that can remove heavy metals at a commercial scale.

What our process does, I think more than any other process, is absolutely destroy the bacteria and other detrimental elements without using enormous amounts of energy.

Some of the other processes combust the material, too, and I am not here to knock the other technologies. I am very happy that we have such a spectrum of technologies, so that ultimately, there would be a market for each one of us, whether for a small community or for a large community, whether there is the need for fertilizer or for a combustible product.

But the amount of energy has to be taken into consideration. Sure, you can put the sludge on the moon, if you want to, but what would be the cost of putting it on a rocket and sending it to the moon? Cost is very important, and therefore efficiency is extremely important, and I do not think today, at this table, or anywhere else in the country, or in the world, there is a process that is more efficient, energy-wise, than the Carver-Greenfield Process.

Mr. **Carper**. Let me interrupt you, if I can. I want to give the other witnesses a chance to comment as well.

Mr. **Kollitides**. Sure. Of course. 200 BTUs per pound of evaporated water, is the energy required in our process.

Mr. **Carper**. All right. Thank you. Please.

Mr. **Greenhut**. If I may I think——

Mr. **Carper**. Would you use the microphone, please.

Mr. **Greenhut.** Sorry. If I may, I think this is a perfect example of what the problem of bringing new technology is into the community. I think that is really what your question is about, rather than a technology. For instance, I am an engineer. I totally disagree with what was just said. So, you can imagine what happens when you are going to a community that hires an engineer. They have to evaluate a variety of technologies.

First of all, in the sewage treatment field, the consultants are basically hydraulic engineers and civil engineers. They may not have the necessary expertise in chemical areas to evaluate some of the things that we have heard here, and rather than going into any specific technology, I think there is a conservatism on the part of these hydraulic engineers that service the sewage plants, to try to get involved with something which maybe they do not feel that comfortable with because of the fact they do not have the experience and background.

And that is really why they are not too thrilled about pushing forward into these new technologies unless, you know, you really can jump through hoops for them, and there is a time limit because of the ocean ban, they have to get out by a certain time, and so I think, practically speaking, to ask someone to commit millions and millions of dollars—and maybe financing through banks which are very conservative—and ask them to do that with a technology which maybe they do not have the ability to fully analyze, I think it is a problem. And I think that is one of the problems that we have seen in trying to bring new technologies into this field.

Mr. **Kollitides.** My esteemed colleague said he disagrees. Would you say what you disagree with? To me, this is a very general statement, to simply say he disagrees with what I said!

Mr. **Carper.** Before I yield to him, let me see if there are any other witnesses who would like to respond to my question.

Mr. **White.** I would just like to emphasize that our oxidation process is a destruction process, and that we believe that we can take care of all of the organic chemicals, and that we can essentially oxidize the heavy metals to the point that they will not leach if they are placed in the environment in some manner.

We have a contract presently with the City of Houston. We expect a subcritical unit to be completed by June of next year, and we will be able to prove out much more of this. Our supercritical process is still in a research mode. In test units, we have destroyed PCBs to the five-nine level with one passthrough. We think we will be able to get greater destruction, in the future, of other resistant organic chemicals. So we very much feel that we have a destruction process that is essentially clean.

Mr. **Carper.** Let me just ask one last yes-or-no question of our proponents of alternative disposal means.

Are the nine or so municipalities that are still dumping in the ocean beating a path to your door, to find out how they can use this new technology to reduce their use of the ocean?

Mr. **Greenhut.** I would have to say that of the nine we have been contacted by four, and have supplied information to four, and I guess we are being looked at as a back-up position by their technical group.

Mr. **Carper.** Our other witnesses?

Mr. **Fassbender**. We have supplied information on STORS to all of the organizations at a recent conference in New York City, and they are aware of it. I think the timetable is such that they have other pressing needs.

Mr. **Carper**. All right.

Mr. **Kollitides**. We have also supplied information to most of them. Some of them are in the process of adopting some intermediate solutions, and I believe you heard from them yesterday. These do not preclude the ultimate solution, which we believe is our process; some other communities, of course, are in the early stages of review.

Mr. **Carper**. Thank you.

Mr. **Kollitides**. Are they beating a path to our doors? I would say maybe, but it is a matter of how they interpret the ocean dumping law, et cetera.

Mr. **Carper**. Again, thanks to each of you for a most informative presentation.

Mr. **Hertel**. Mr. Hughes of New Jersey.

Mr. **Hughes**. Thank you, Mr. Chairman. I want to also welcome the panel, and thank you for your contributions today. It has been a very interesting panel discussion.

Mr. Kollitides, what is the status of the facilities in Mercer County and Ocean County? Are they operational?

Mr. **Kollitides**. The Mercer County facility is between 85 and 87 percent complete. About a year and a half ago, their main constructor—I say "their" because they managed the constructor—the construction company that was building the plant defaulted, and since then they are in litigation; only recently—about two weeks ago, as a matter of fact—they went out on bids to bring a new constructor to complete the construction.

Mr. **Hughes**. I understand. What is the status of the Mercer County facility?

Mr. **Kollitides**. That is the one I just answered.

Mr. **Hughes**. How about Ocean County?

Mr. **Kollitides**. At the Ocean County facility, the building is up; they started the construction about a year ago, and right now they are in the process of moving in most of the major equipment. I would say in about a year, or so, they will be in a position to start up the facility.

Mr. **Hughes**. Now the Dehydro-Tech technology does utilize heat and is an incineration process, is it not?

Mr. **Kollitides**. No. If I may explain it. The Carver-Greenfield Process, which is what Dehydro-Tech Corporation's total technology is based on, is a multiple effect evaporation technology. The sludge, after it is mixed with a light oil, an outside oil that we mix it with to make it pumpable, is evaporated through various stages, so that all the water goes out of the sludge. The only thing that remains, now, is sludge and oil.

Mr. **Hughes**. But my question is, it does utilize heat, does it not, to create the evaporation?

Mr. **Kollitides**. That is correct. For the evaporation you need heat. Yes. That heat is generated by combusting the very sludge oil that we extract from the sludge.

Mr. **Hughes**. Now at what temperature is it heated?

Mr. **Kollitides.** The water of course is in the form of steam. Therefore, you have to reach steam evaporation temperatures.

Mr. **Hughes.** Does it emit any particles?

Mr. **Kollitides.** About 250 to 300 degrees in the water.

Mr. **Hughes.** Does it emit any particles into the atmosphere?

Mr. **Kollitides.** No, for the following reason. I will give you a specific example. The facility at Los Angeles, the Hyperion facility, today emits less pollution to the atmosphere than before the Carver-Greenfield facility was placed there, because they have good air-quality control equipment and this information can be checked with them. They are way below emission standards.

Mr. **Hughes.** So your answer is it does not emit any particles into the atmosphere?

Mr. **Kollitides.** No particles.

Mr. **Hughes.** All right.

Mr. **Kollitides.** The particulates are about 99.9 plus percent removed through baghouses and, of course, scrubbers.

Mr. **Hughes.** Mr. Greenhut, you have some 80 different facilities in operation around the world?

Mr. **Greenhut.** Excuse me?

Mr. **Hughes.** You have 80 facilities in operation——

Mr. **Greenhut.** No; no.

Mr. **Kollitides.** That was us.

Mr. **Hughes.** I see. How about your technology?

Mr. **Greenhut.** The quantity of facilities?

Mr. **Hughes.** Yes.

Mr. **Greenhut.** We have built, I believe it is eight facilities, in Japan. We are just building the first facility, now, in the United States.

Mr. **Hughes.** I see. And does that likewise rely upon using heat?

Mr. **Greenhut.** Yes; most definitely. I do not wish to get into a semantics situation, but incineration is, by definition, it combusts to an ash. With vitrification there is no ash, and there are also other chemical reactions taking place. For instance, incineration is an oxidation chemistry where vitrification is a lot of silicates. It is a silicate chemistry as well as a partial oxidation——

Mr. **Hughes.** Now your vitrification process utilizes the oil that is in the sludge, does it not?

Mr. **Greenhut.** Yes; that is correct. The sludge material itself, both components—the organic, which the oil is a portion of it, and the inorganic—are both put together into the system.

Mr. **Hughes.** And what uses does Japan propose for the end process, the end use?

Mr. **Greenhut.** Well, again, I mentioned that there were a variety of uses that it has been allowed to be used for, but to give a specific example of one of the plants, which is in Oyabe, the local town uses paving blocks instead of concrete for their sidewalks, and what they will do, they will be using approximately 20 to 30 percent of this material for that block, which is then used by the local municipality.

Mr. **Hughes.** Is it like a brick, or is it a block?

Mr. **Greenhut.** It is a paving brick. You know, it is an interlock, sort of wavy type of brick. And this is just one instance. They also use them, for instance, to make bathroom tiles, which again, would be put inside a bath house.

Mr. HUGHES. And has research indicated to you how that will hold up in the weather, that material?

Mr. GREENHUT. Well, the chemical analysis of the material is that it is basically a silicon oxide and a calcium oxide, no different than any other inorganic gravel, or rock-type substance, without being too specific because of different kinds of rocks.

Mr. HUGHES. Is there any risk that, for instance, a rain will in fact——

Mr. GREENHUT. Leach the material?

Mr. HUGHES. Leach that material into the aquifers in the area?

Mr. GREENHUT. The testing that has been done—we have supplied EP toxicity tests on the material, and the EP toxicity tests have displayed that the material does not leach; not that it meets the EP tox test, but it does not leach. That is a difference.

I might add that I was at a vitrification facility that was vitrifying ash from a municipal solid waste incinerator, and that vitrified material was used in a rice field to raise a portion of the field to build a little league field.

I believe there are two rice productions a year, so that area will be flooded and drained twice a year, and that water will be directly in contact with the food source. So the Government has done quite extensive testing before allowing that to happen.

Mr. HUGHES. Mr. Fassbender, I gather your process is called the STORS process?

Mr. FASSBENDER. Correct.

Mr. HUGHES. It also utilizes the oil that is in the sludge?

Mr. FASSBENDER. I would like to clarify that. The amount of oil that is actually in sludge is a very small amount. In our process, there is a chemical conversion that changes the carbohydrates, proteins, and lignins into hydrocarbons.

Mr. HUGHES. And what is the use of the end product that you are left with in the sludge? What is that used for?

Mr. FASSBENDER. Well, the end product, depends on what goes in if it is contaminated it will have to be cleaned or burned in a high temperature furnace. If it is not contaminated, then it would be burned as an oil, or boiler fuel product.

Mr. HUGHES. So you end up with the same heavy-metal concentration that——

Mr. FASSBENDER. No, the heavy metals are split out into a char fraction, so they are separated, and that char fraction is an oxide, and, as in the Oxidyne case, it is an oxide, carbonate material. We have not had the opportunity to do enough research to determine whether or not they would leach.

Mr. HUGHES. Mr. White, I gather your oxidation process is experimental in nature and——

Mr. WHITE. Not really experimental. In fact EPA participated with a competitor of ours, Vertech, in a deepwell wet oxidation facility at Longmont, Colorado. They have a report on this. It is presently being dismantled because they did not generate enough sludge there. I do not know why they selected that particular site.

But it did prove destructions up to 80 to 85 percent of COD, and its technology is a variation of our technology.

Mr. HUGHES. But your technology would still take the water that is left, and put that back into a waste-water treatment system?

Mr. WHITE. That is correct. We return it back to the waste-water treatment system.

Mr. HUGHES. And does it emit any particles into the atmosphere?

Mr. WHITE. No particles. The carbon dioxide is principally the emission, and that is minimal. Mr. Eller might be able to add a little more to that, if you would like to hear more.

Mr. HUGHES. Well, I do not really have very much more time. I just want to reinforce what has been said. It is understandable why municipalities have so many difficulties in attempting to choose technologies. It is mindboggling that you are talking about tens of millions of dollars in investment. And unfortunately, in my own State, it seems to me they receive very little direction from the State Environmental Protection Agency that has responsibility, or from the Environmental Protection Agency. We have no clearinghouse to attempt to provide——

Mr. WHITE. May I make just one comment. The City of Houston is not spending a penny to construct this facility. It will be constructed with private firms, so they are not at risk. If it does not perform, they have lost nothing, and we are confident it will perform.

Mr. HUGHES. I think it was Ms. Edgerton that probably made the comment, that the Environmental Protection Agency does not provide the guidance that we need to provide. It seems to me, that with all the minds that we have—the scientific community that exists in this country, our universities and colleges around the country, the Environmental Protection Agency itself, and in our various State environmental agencies—that we cannot develop the capability to analyze these technologies for municipalities, and attempt to critique the technologies.

Obviously it would be important, I would think, to have a number of different model programs under way to try to test the technologies, but it would seem to me to be a tremendous service to States and communities if in fact we had a clearinghouse that would provide that kind of expertise to analyze, for instance, a technology that has been testified here today, and all the other technologies that are out there, either on the shelf or in the research stage.

Mr. WHITE. May I make one brief comment?

Mr. HUGHES. Sure.

Mr. WHITE. In my recent life, I worked with EPA for a lot of years. My last two positions, I was the regional administrator in Atlanta, and also regional administrator in Dallas, and EPA has a very undirected research program. It is unbelievable. I can just tell you that, and will not go further into it.

Mr. HUGHES. I would believe it.

Mr. WHITE. They simply do not apply the dollars where they should be applied.

Mr. HUGHES. Well, it is sad because, frankly, waste management is a humongous problem, and if we could just develop some guidance for municipalities, provide some direction to indicate, what our permitting process is going to be, so that we can send very clear signals to municipalities as to what is expected of them——

Mr. **White**. I could not agree more.

Mr. **Hughes**. —— and offer them the various alternatives, depending upon their needs, and what part of the country.

Now your technology would lend itself to the South where you have deep wells, but that would not be appropriate in New Jersey where the only wells we have are water, and we are having problems with them.

But it seems to me that would be of tremendous assistance to the various vendors that are out there, and research units, as well as to municipalities.

And finally, I just want to ask Sally Lentz of the Oceanic Society—whose testimony I appreciate very much—this question. You suggested that the EPA has the "cart before the horse" with regard to the permitting process; that they have already granted permits to municipalities before they have either enforcement or compliance agreements in place.

And it is my understanding that they are just proposed permits. Isn't that so?

Ms. **Lentz**. That is right. I specifically said they were simply proposed. But the difficulty we had in analyzing the permits is that so much of the information that would be contained in those compliance and enforcement agreements pertained to meeting the requirements of the Ocean Dumping Act for issuance of a permit.

Specifically, that is, with respect to the requirement under the Ocean Dumping Act to demonstrate need for the dumping activity, which necessitates a look at alternative technologies that are available, and an analysis of those technologies. That information was absent, basically, from the permit applications primarily because that information would be included, we presume, in the compliance and enforcement agreements.

So it is difficult for us to analyze the permits without that information.

Mr. **Hughes**. I understand. Well, I have a great deal of respect for the Oceanic Society. They do really outstanding work and I am very proud of your initiatives. I am not quite as pessimistic as you are about the process. I realize it is often popular, back home, to jump on the Environmental Protection Agency. It is fashionable in some quarters. But I really think that they are doing a fairly good job.

And I think the process is moving along fairly well, given the complexity of the problem, because my constituents want us to stop ocean dumping yesterday. They do not understand why we selected 1991.

They do understand when you ask them, what are you going to do with the stuff; we just have not developed alternatives. But they still want it done as soon as possible.

And it seems to me the EPA is moving the process along fairly well, given the serious problems. I mean, the very fact that New Jersey is suing EPA indicates to me that the law is hurting, and that is what it is intended to do. It is intended to get their attention. My father used to say, "You want to get their attention, you hit them with a four by four." I think they have been hit with a four by four, and I really believe that the process is moving along fairly well.

Ms. Lentz. Well, I suppose part of the reason that we are discouraged is that we are up against the August 14th deadline to come up with these agreements, and we understand that EPA was hoping to publish them for public comment by March 1st, and they obviously have not met that deadline.

So we are concerned that the public is going to be left out of the process when we get closer and closer to the August 14th deadline. But I agree with you, it is a very difficult problem. There is at least some progress——

Mr. Hughes. Well, you have looked at the law. In your judgment, is the law calculated with the fines and the penalties, and the incentives, to effectively get them out of the ocean?

Ms. Lentz. That is what we are hoping for, obviously, but we are reserving judgment on the effectiveness of the Act until we see the compliance and enforcement agreements, because the effectiveness of the Act is only going to be so good as those agreements, and how well they are implemented.

Mr. Hughes. I agree. We are all waiting with bated breath for those enforcement agreements or compliance agreements. Thank you. Thank you, Madam Chairlady.

Mr. Kollitides. Could I make a very brief, factual comment, about 10 seconds, just so that you have all the facts. It was said earlier that sludge contains very little oil. The actual number is between 10 and 20 percent of the sludge is sludge oil. Whether we choose to call it very little, or a lot—it depends on the individuals, I guess, and how they view it.

Mr. Hughes. Well, that is almost as much oil as we have in Texas.

[Laughter.]

Ms. Edgerton. Mr. Hughes, I would like to say that the NRDC has observed this process, and Region II, I would agree with you, is making an impressive and enormous effort to try to implement this Act, and I have observed also that they have a task force there. They have been working closely with the Justice Department, and it is unparalleled, in terms of the commitment that they are making.

Mr. Hughes. Madam Chairlady, I thank Ms. Edgerton for that. I want to say, also, that the Natural Resource Defense Council has done an outstanding job, and I think it is important to say that, because I really think that they are making a serious effort at it. We need to say that once in a while because they get the criticism all the time but they do not get the "thank yous" and "go at it." Thank you.

Mrs. Lowey. [presiding.] Thank [illegible] Mr. Pallone.

Mr. Pallone. Thank you. I read Ms. Edgerton's testimony, but I was not here at the time when you spoke, and Ms. Lentz. I am trying to get a handle on what you are saying as opposed to what the EPA or the New Jersey DEP said yesterday in terms of implementing the Act. Because some of the statements seem to be contradictory.

For example, one of the concerns I had yesterday was that it appeared the EPA, and then the State DEP, in the case of New Jersey, were just passing the buck, in that they were saying that they cannot tell local authorities what options to utilize. My concern was that, particularly in New Jersey, almost all of the authorities seem to be moving in the direction of incineration rather than recycling or composting, or re-use alternatives that both of you have talked about, and that both Mr. Muszynski and Mr. Deieso articulated, that they would favor.

But you say in your statement, Ms. Edgerton, that the EPA should undertake an independent analysis of the problems confronting the various dumping authorities, and the resources available to them, with special attention to beneficial use, and safe disposal.

And then you say that such an analysis is mandatory because the Ocean Dumping Ban Act requires that compliance and enforcement agreements contain schedules that specify reasonable dates for implementation of alternative disposal methods.

I got the impression from the EPA and DEP officials yesterday, that they had no authority whatsoever to dictate or even encourage, in a significant way, some of these alternatives that are being discussed, and that if the authority said, hey, we want to go the incineration route, that is it.

Could you just clarify that, because it is a little unclear to me.

Ms. EDGERTON. Actually, before you came in, I picked up on that line of questioning that you had raised yesterday—that was our concern—and NRDC has taken the position—and we strongly believe—that EPA has the obligation not only to implement the Ocean Dumping Ban Act, but also the Clean Water Act and the Clean Air Act, Endangered Species Act, et cetera.

What that means is, when these plans are developed, EPA should try to make sure that these plans are going to comply with other environmental statutes.

Mr. PALLONE. I used the term "pass the buck." I got the impression that there was very little direction, and that even though the EPA might prefer some of the re-use alternatives, that they did not feel they could compel, or even pressure, the local authorities, in any way, to come up with some of the alternatives, and if they wanted to go the incineration route, that was it.

Ms. EDGERTON. I got a similar impression.

Mr. PALLONE. But you do not think that is true, based on the law?

Ms. EDGERTON. No; I do not. I think that this law provides them an opportunity to chart an integrated system for phasing out the sludge, and as Sally Lentz of the Oceanic Society has said today—and NRDC also supports this—we think your idea of reducing the toxic contaminant load of that sludge, as it is continuing to be ocean dumped, makes sense.

Because then, when it comes time to put it on land it will be cleaner. So, rather than reducing the discharge rates, it seems to make more sense to reduce the contaminant—or perhaps to do both, but certainly to reduce the level of contaminants in the sludge itself.

So what you were saying yesterday—is what I understood what you were saying or expressing—was a frustration, which we share, with the process, in that it does not seem to be broad enough in scope to manage the ultimate destiny of this sludge. We do not think they have to, necessarily, under the law.

Mr. PALLONE. They may not have to, but they have the ability.

Ms. EDGERTON. We think they have the opportunity.

Mr. PALLONE. Okay. Let me ask——

Mr. KOLLITIDES. Mr. Pallone, may I add to that a little bit, if I may.

Mr. PALLONE. Yes, except I am running out of time. But go ahead.

Mr. KOLLITIDES. In fairness to the EPA, they funded, they subsidized, if I may, the two plants in New Jersey; and you asked an earlier question, has all of New Jersey gone the incineration way? The answer is definitely no.

Mr. PALLONE. Oh, no, I realize that.

Mr. KOLLITIDES. Trenton and Ocean County have gone for fertilizer by means of Carver-Greenfield.

Mr. PALLONE. Yes, there definitely are examples the other way. But of the New Jersey authorities that are now ocean dumping, we are told that there is only one, Middlesex, that is really looking at one of those alternatives.

Ms. EDGERTON. May I make a correction to the record. I do not want to see this a year later in some of my testimony. I said we do not think they have to. We do actually think they have to comply with all the laws. All the laws—you know—the Clean Water Act, the Clean Air Act, and all the other aspects of it, in the implementation of the Ocean Dumping Ban Act. Thank you.

Mr. PALLONE. I understand. Let me ask you this: One of the other concerns I had is that without criteria being promulgated, or standards promulgated for ocean dumping, which I would perceive as forcing a certain amount of pretreatment, that it is very possible that the authorities—I am thinking again of New Jersey, but it would apply across the board—will not be able to meet the 1991 deadline, or even come close to it because of the fact that they are not putting in the proper pretreatment now, or they are not scheduling pretreatment so that they can have land-based alternatives that would meet the criteria for a land-based application, whether it be incineration, composting, or whatever.

What is going on in that regard? I mean, what is the Federal Government doing with regard to pretreatment now? What are they requiring, so that we can move forward in this regard? I did not get an answer to that question yesterday. Maybe if you could answer it, either of you.

Ms. EDGERTON. Well, the NRDC has been urging that the pretreatment programs of these particular ocean-dumping municipalities receive special attention by EPA Region II, and the authority for that is found in the Clean Water Act Amendments of 1987, which directs EPA to take all necessary steps to protect human health and the environment in the interim, before standards are finally promulgated.

So we have written EPA and asked them to do that, and we are doing the best that we can to try to get a more aggressive pretreatment program.

Mr. PALLONE. Well, let me see if I can explain my problem. On the one hand, I am told with the New Jersey authorities, that they cannot meet the 1991 deadline with their long-term plans, which, in most cases, is incineration. So what they are going to be doing is sending the sludge to out-of-State landfills.

Now my understanding was that one of the reasons they are sending it to out-of-State landfills was because the sludge that they are now dumping in the ocean is of such quality that they could not take it any place in New Jersey. That taking it out of the State, or out of the metropolitan area, they were going to be subject to different standards for landfilling than they would be in New Jersey. Is that true?

Are their standards different in terms of where they landfill because they are out of State, or in other States?

Ms. **Lentz**. My understanding is—and this may or may not be correct—but my understanding is that under State law, there are some differences in what can——

Mrs. **Lowey**. Ms. Lentz, excuse me. Could you put the mike closer to you. Thank you very much.

Ms. **Lentz**. My understanding is that there are some differences under State law as to what kinds of sludge can be landfilled in different ways or can be used for composting, or for fertilizer. So there are different sludge criteria under various State laws, and I believe that the criteria—in New Jersey, for example—for use of compost from sludge, are much more stringent if you are going to use the sludge for food crops, than if you are going to use the sludge for some other purpose.

So I believe that there are some differences under State law.

Mr. **Pallone**. See, the problem that I saw posed was that one of the major reasons why the sludge is now dumped in the ocean is because it does not meet land-based criteria. In other words, that very sludge that is now dumped in the ocean by New Jersey authorities could not be incinerated now in New Jersey, could not be land-applied. It maybe could be landfilled but there is not a landfill space available so that is why it is dumped in the ocean. Other factors come into play as well.

So now, since they cannot meet those standards, or since there are not any standards, they are trying to push it into Pennsylvania. If that does not work, which is very possible, then what happens? If they have not put the pretreatment in place by 1991, and they cannot ship it to Pennsylvania, then what do they do with it? If they do not have their long-term processes in place, are they going to come back again and say, "Hey, we can't do anything else so we'll have to continue to dump in the ocean."?

The only answer to that is to put either in their permits, or to establish the general national standards that would force the pretreatment, so that the sludge becomes cleaner, and then it does not matter that much what you do with it. You can use any land-based alternative.

But I do not see any movement in that regard, and I think that is what you are objecting to, if I am not mistaken.

Ms. **Lentz**. Well, we certainly share that concern and in fact in our full written statement, we suggest that there be some restrictions placed in the ocean-dumping permits themselves.

Mr. **Pallone**. In the absence of standard criteria, you put them in the permits.

Ms. **Lentz**. Yes, basically to link the pretreatment requirements to the permit, so that a violation of those pretreatment requirements would also be a violation of the permit.

Mr. **Pallone**. But we are not told, based on what the EPA or the New Jersey DEP said yesterday, that that is taking place.

Ms. **Lentz**. My understanding is that it is not.

Mr. **Pallone**. That is not a part of what they are negotiating in any way. Okay. Madam Chairwoman, let me just ask this of Ms. Lentz. Again, I read from the beginning of your statement. One of the most glaring discrepancies that I see between yesterday's testimony and what you have said today, is that everyone from the agencies kept repeating that there is no degradation to the marine environment resulting from ocean dumping at the 106-mile site. There is no evidence that there is any effect on humans, or on fish, or whatever.

And of course you say, right in the beginning of your testimony, that just the opposite is true, and all the data and scientific evidence that does exist would point to the fact that there is that degradation.

You know, I am just amazed by the contrast between the two, and I guess it all comes back to this kind of four-tiered analysis that Ms. Lentz was critical of, particularly the fact that, as the Inspector General's report pointed out, they have not even gotten to the tier four levels, where they really look at the long-term effects of all this.

What can we do in that regard? It just seems absurd for you to be saying that there is this serious problem out there, and the EPA saying there is not.

And the main reason why I think they can say there is not is because they have not done the analysis that is required by the law. Just comment on that, briefly, if you could.

Ms. **Lentz**. If I may turn the mike over to Boyce Miller who is our staff scientist, who is probably better able to address that question.

Ms. **Miller**. Yes. I think that you are absolutely right about that. They can say that simply because there is no information to say, one way or the other, whether there is an effect—and this was something that came up at the monitoring workshop.

Many of the participants in that workshop felt that this was a serious problem. The fact that there has been no baseline data—which now cannot be collected—makes it difficult, if not impossible, to ever say that the sludge-dumping alone is causing an effect that is later monitored.

So at this point, it is essential that the monitoring of biological effects be conducted—and it should be going on right now, not waiting as is their plan, for some future time, when they determine tier four should finally be approached.

It should have been started before the dumping. In lieu of that, it should have been started immediately upon the commencement of the dumping. It still has not been done, so it should be started now. And if environmental damage is found, we feel that it is essential that they do not have to make a proved link between the actual sludge dumping and the environmental damage, because the lack of baseline data makes that proof impossible.

So, if we see damage in the environment out there, we must assume, on the basis of what happened at the 12-mile site, that the potential for further damage due to sludge dumping does exist. Therefore, there must be a response by either changing the requirements of the permits, or actually suspending sludge dumping, if there is environmental damage detected.

And you have to make the measurements before you can detect the damage.

Ms. **Lentz**. If I can add one point to that, as our testimony suggests, there is some detailed information concerning the health of that site as it currently ~~stands,~~ and the information suggests that it is already a stressed environment. There have been decreases in phytoplankton, for example, at that site. The phytoplankton are at the very base of the foodweb. If we are seeing changes in those communities, then we have cause for concern about communities farther up on the foodweb.

Mr. **Pallone**. Well, we have been told that by those that frequent the site including several organizations of fishermen, tuna fishermen, or other long-line fishermen that are out there, that theirs has been a serious problem. I would have some more questions but I will stop now. Maybe we will have a second round. Thank you.

Mrs. **Lowey**. Thank you very much, Mr. Pallone. Mr. Lent, would you like to ask a question?

Mr. **Lent**. Thank you. I would like to ask a question either of Ms. Lentz or Ms. Edgerton about the situation.

At the time we passed the Ocean Dumping Ban Act in the closing days of the last session, it was contemplated that the 1991 date would end the legal dumping of sewage sludge, but that certain municipalities, such as the City of New York, for example, would nonetheless continue to dump sludge while they were making preparations for some alternative means of disposal. The fees and the penalties would be like $100 a ton the first year, and going up to $600 a ton, even higher, after 3 or 4 years.

Was that your understanding of the way the bill was going to operate? Was that your understanding of what was behind the legislation that was contemplated, that certain municipalities would continue, nonetheless, to dump beyond the 1991 date? That is the legislative history of that bill?

Ms. **Lentz**. My understanding was that every attempt was going to be made to negotiate an enforcement or compliance agreement that would get each and every dumper out by 1991.

Mr. **Lent**. But it was contemplated, was it not, that there were some communities that, because of the amount of the sludge, would need additional time? That they would pay these fees, or penalties, and that some of those fees and penalties would be recycled back to help those communities find environmentally acceptable alternative solutions to their sludge problem?

Ms. **Lentz**. Well, I have to admit, I have not examined the legislative history recently on this particular point, but my understanding was that for those dumpers that would enter into an enforcement agreement, the idea was to basically provide for a forced savings program, if you will, to require them to pay penalties into a fund that would then be used to develop the alternatives that they say they are unable to develop.

So that by 1991 they could be completely out of the ocean. That is my recollection.

Mr. **Lent**. The penalties did not trigger until after 1991.

Ms. **Lentz**. Well, I may be mistaken, but my understanding was that the penalties would be in place prior to that date.

Mr. **Lent**. There were some fees that were to go into effect earlier.

Ms. **Lentz**. I am sorry. I am getting the semantics confused.

Mr. **Lent**. The fees are assessed prior to 1991, but after that, when you get up around 1993, the penalties would be $600 a ton. There is even language in that statute that says that in lieu of other penalties, these would be the penalties for ocean dumping of sewage sludge, beyond these deadlines.

My question is—and I understand your position, which is 1991, everything should stop. But suppose you have a community that sits on a underground aquifer that needs to be protected, so you cannot put the sludge in the ground. And suppose you are in a community that is a nonattainment area under the Clean Air Act, and not allowed to build an incinerator to burn the sludge.

And now you cannot dump the sludge at the 106-mile site. What would you suggest that the community do between now and 1991, having in mind that already we are into May of 1989? You are an environmentalist, and we are interested in hearing from you.

Ms. **Lentz**. I would hope that those communities would pursue some of the options that were discussed here this morning. Not that I necessarily endorse any or all of them, but——

Mr. **Lent**. You would be against them, too, probably.

Ms. **Lentz**. Not necessarily. Some of what I heard this morning was very encouraging, and I am concerned that too many communities are looking only at incineration as the alternative, or landfilling as the alternative, but there are other options that are available. Some we heard today, but there are also other communities, large communities around the country that, for example, convert sludge into fertilizer or into compost.

Now your ability to utilize the sludge in that way depends upon the quality of the sludge, so——

Mr. **Lent**. Well, you have to have a place where you do this. A big, smelly, messy factory has to be sited some place where this sludge is concerned into fertilizer and certain contaminants have to be removed that somehow will find their way into our sewage plants.

Ms. **Lentz**. I agree with you. That is a difficult problem. You are going to have a hard time siting an incinerator anywhere as well.

Mr. **Lent**. Have you ever heard the term "environmental gridlock"?

Ms. **Lentz**. Yes. I am very familiar with it.

Mr. **Lent**. It seems to me we are in that kind of position, particularly in the New York metropolitan area, now, where they are not allowed to burn it, they are not allowed to put it in the ground, and they are not allowed to dump it in the ocean. It would be great if there was some alternative means of disposal that was feasible.

Ms. **Lentz**. Well, I do not know if you were here for the earlier discussions, but there are some options here that were discussed this morning, that appear to be feasible at some level, and those are the options, and the other options that would use the sludge in some beneficial way are the ones that we would hope both the municipalities and EPA would pursue.

Mr. **Lent**. I have no further questions. Thank you.

Mr. **Kollitides**. Mr. Lent, may I comment on something you said, that the plant has to be "big and smelly."

Mr. **Lent**. Surely.

Mr. **Kollitides**. The Los Angeles Hyperion C-G plant is only within a few hundred feet of an affluent, upper-middle class community, El Segundo. It is near the airport. It is not "big" and it is not "smelly." It is all contained inside a building and it is under negative pressure, and the air that is collected from the building is not Chanel number five, but that air goes into a combuster and it is burned. When "smelly" air is burnt, it is no longer "smelly."

Mr. **Lent**. Well, back on Long Island, I live one mile from the Bay Park Sewage Disposal Plant, and everybody who works there——

Mr. **Kollitides**. Totally open. You are probably right; it is probably open. It is not enclosed.

Mr. **Lent**. Everybody who works there says it does not smell; but I live there.

Mr. **Kollitides**. Oh, yes. Sure; if it is open, I agree with you.

Mr. **Lent**. I mean, there are children in the neighborhood who wake up at night throwing up in their beds from the way this place smells.

Mr. **Kollitides**. Sure.

Mr. **Lent**. It is not that way every day, but when the wind is in the right position. It is not a pleasant situation.

Mr. **Kollitides**. I agree with you. Unless it is enclosed, it would smell.

Mr. **Lent**. This 1991 deadline, which the EPA said yesterday they were going to enforce, is a deadline that would require the County of Nassau, which I represent a slice of, to rush helter-skelter forward with some sort of a dewatering process, that would not have any consideration for the community, for the odors, and build a jury-rigged operation in order to meet the deadline.

Whereas they had planned to move forward with a construction program, so that by 1994 they would have in place a nice clean plant—maybe your project, or maybe somebody else's project. They are talking about pelletization. They could do all of this, but they need some time to do it.

Mr. **Kollitides**. I do not disagree with you. I was only commenting on the smell.

Mr. **Lent**. And when we passed the statute contemplating, that although it would be illegal after 1991, certain communities—New York City, Nassau County—would nonetheless continue to dump sludge at the 106-mile site until they were able to put in place, in an orderly fashion,an alternative. The fees and penalties would be recycled to help those same communities find an environmentally good alternative, maybe your system or one of your competitor's systems.

We learned yesterday, that the EPA is, in addition to charging the penalties in the statute, which are supposed to be exclusive, found some other statute where they are going to sock them $10,000 to $50,000 a day extra penalties.

I mean, it is like Kafkaesque; it is like the Soviet Union. The EPA was saying we have found another law and we are going to hit you with this one. They were very arrogant about it. I was shocked yesterday. I walked out of this room incredulous.

I thought my public works administrator who was going to testify—and I read his testimony—did not understand. The EPA wants to help. They are interested in the environment. But when I asked EPA the questions, I found, to my chagrin, shock, that no, they were going to insist on $50,000 a day after 1991. Now some of these folks are complaining that the EPA is not being tough enough, but I want to tell you—it was like another country was being represented at the witness table yesterday.

I am just trying to get a handle on this thing, because I sat on the conference committee, and it was in this room where we wrote that bill. I want to tell you, the way these guys are enforcing this law, that ain't the way we wrote the bill. And when I say "these guys," I mean the EPA Administrator. We are going to have to do something.

I have already talked about this with some of the people on the Appropriations Committee. The EPA is going to have a little trouble getting any money in their budget the next time around unless they start to help these communities rather than act as a gendarme, and play out some sort of a Kafkaesque tragedy. My county is a good county; we are a clean county. We try to comply with the law.

But the way EPA apparently intends to enforce this law is going to make it very difficult. Nassau County is going to have to rush forward and do something which is going to be foolish, expensive, and not really, in the long-run, environmentally, anything that the witnesses could be proud of. You may get your way, and EPA will enforce the law, but at a great price. Thank you, Madam Chairman.

Mrs. LOWEY. Mr. Hochbrueckner, do you have any questions?

Mr. HOCHBRUECKNER. No, Madam Chairperson, I do not have a question right now. While I am inquisitive about this process, the Dehydro-Tech Corporation process, I will not burden my colleagues with my technical questions. But I would like to talk to Mr. Kollitides about the process after the hearing. It sounds interesting and I would like to get some more inputs on it.

Let me just ask this: based on your two-page statement, you indicate that this process has been around for 30 years, and that you have utilized it in other countries. You list three locations in Japan.

Are there any facilities in the United States that are operating right now?

Mr. KOLLITIDES. Yes. The Los Angeles Hyperion facility is operating right now.

Mr. HOCHBRUECKNER. Is this the El Segundo one you mentioned?

Mr. KOLLITIDES. Yes! And it is increasing in capacity. It only began actually processing sludge earlier this year, and it is at about 40 to 50 percent capacity right now. As you know, these processes have to come up to speed slowly, and securely, to make sure that the operational people learn how to operate the equipment, and so forth.

Mr. **Hochbrueckner**. But that is the only facility in the United States?

Mr. **Kollitides**. In the United States, operating on municipal sludge. There have been many others in the United States: slaughterhouse material; chemical material, etc. But for municipal sludge, that is the only one that is operational today, and three others are under various stages of construction completion.

Mr. **Hochbrueckner**. I assume you are inviting people to come by and see it in operation?

Mr. **Kollitides**. We are very glad, for anybody who is interested, to make arrangements that they visit it and they see it. We have had people from around the world—from Holland, many from Japan, and many other countries, visiting the plant in recent times as well as a couple years ago.

Mr. **Hochbrueckner**. Thank you very much.

Mr. **Kollitides**. We just installed a similar facility in Holland, after they looked at various technologies, not to process municipal sludge, but animal manure, which they now use as a fertilizer for tulip beds, and many other similar applications.

Mr. **Hochbrueckner**. Well, I think I will not touch that with a 10-foot pole. Thank you, Madam Chairlady.

Mrs. **Lowey**. Thank you, Mr. Hochbrueckner. We are running out of time.

I did want to ask Mr. White one question, because in Westchester County, we, too, want to comply, but we are having a hard time getting the process in place in time.

Could you tell me what your process would cost a municipality such as Westchester County in implementing the process?

Mr. **White**. I cannot give you a cost at this time. It would be more expensive than of course our cost at Houston because of your subsurface area there, I understand granite. We have a drilling company who is going to do a rough estimate. We think it will probably double the drilling cost.

So we still think we can be competitive. We have responded to the requests for comments on their proposal they are going to put out in Westchester County.

We would like to be able to submit a proposal finally on that, but we would have to put our facility on site, probably they would have to dedicate, say, one and a half to two acres, and we think that we could fit in our facility there quite well.

I could not give you a cost estimate at this time, but it would be a cost per dry ton of sludge processed and the company would pay for the construction cost.

Mrs. **Lowey**. Thank you. Ms. Lentz, I am particularly interested in your proposal in turning the sludge into fertilizer. I had worked with Bronx Frontier for many years, where they were turning their remains into fertilizer. Do you think it would work? What about the heavy metal content of the sludge?

Ms. **Lentz**. Again, it would depend on what you wanted to use the fertilizer for, and what the particular requirements are in your

State. You might still have some heavy metals contained in the fertilizer, and depending on the levels of those metals you may be restricted in the kinds of uses you can put it to.

But my understanding is that there are some communities around the country that are using their sludge for fertilizer, so it really does depend on the quality of the sludge and the quality of the fertilizer that you can come up with in the end process.

Mrs. LOWEY. Now just to conclude—and I apologize for coming in here late—it seems to me that we owe our communities out there—communities such as Westchester, Nassau, the Island, which are really trying to comply, some information from the Federal level, and I would like to suggest that perhaps EPA can have a roundtable, where you and everyone else who has alternate technologies, would be present to share their knowledge.

It seems unfortunate, to me, to ask a community to comply when, on the Federal level, we are really not providing the expertise in any directed manner. So I would hope, as a result of this hearing, we can call on EPA to provide some answers, to provide a means through which we can share our technologies, and insist that communities who really do want to comply, who are sincere in their desire to comply, and I want to thank you very, very much for your testimony here today.

Hopefully we will see you again at a roundtable that EPA will call, so that we really can provide the answers. Thank you. The meeting is adjourned.

[Whereupon, at 12:01 p.m., the subcommittees adjourned, subject to the call of the Chairs.]

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U.S. House of Representatives
Committee on
Merchant Marine and Fisheries
Room 1334, Longworth House Office Building
Washington, DC 20515-6230

CHIEF COUNSEL
EDMUND B. WELCH

CHIEF CLERK
BARBARA L. CAVAS

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BACKGROUND MEMORANDUM

TO: Members
Subcommittees on Oversight and Investigations
Oceanography and the Great Lakes
Fisheries and Wildlife Conservation and the Environment

FROM: Committee Staff

SUBJ: Ocean Dumping Oversight Hearing

DATE: May 12, 1989

On **Tuesday, May 16, 1989, at 1:30 PM**, and continuing on **Wednesday, May 17, at 10 AM, in Room 1334 of the Longworth House Office Building**, there will be a joint oversight hearing on the implementation of title I of Public Law 100-688, the Ocean Dumping Ban Act of 1988. The purpose of the hearing is to examine the status of negotiations on compliance and enforcement agreements, proposed permit terms and conditions, monitoring at the 106-Mile Site, and alternative technologies for the disposal of sewage sludge. Sewage sludge is a by-product of the sewage treatment process.

Invited witnesses include representatives from the Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and the Coast Guard; the municipal authorities involved in the dumping, including New York City, Nassau County, Passaic Valley and Middlesex County; the New York State Department of Environmental Conservation (DEC) and the New Jersey State Department of Environmental Protection (DEP); the environmental community; and experts on alternative technologies.

BACKGROUND

A. HISTORY OF OCEAN DUMPING

In 1972, Congress enacted the Marine Protection, Research, and Sanctuaries Act (MPRSA). The purpose of the Act is to regulate the transportation and dumping of material into ocean waters. Title I of the Act contains provisions requiring EPA to administer a permit program, penalties and general enforcement of the Act. Title II of the Act contains a monitoring and research program administered by NOAA and the Coast Guard, and Title III establishes a marine sanctuary program.

Pursuant to the MPRSA, EPA designated various sites for ocean dumping of sewage sludge, dredge spoils, industrial effluent and other waste, principally within an area called the New York Bight (see Figure 1). Until 1987, sewage sludge was dumped at the 12-mile site at the Bight's apex, which is located approximately ten nautical miles east of Sandy Hook, New Jersey. In 1986, EPA determined that significant ecological impacts could be attributed in part to sludge dumping at the 12-mile site. Therefore, the agency decided to phase-out dumping operations at the 12-mile site by December 31, 1987, and to designate a new deep water dumpsite, approximately 106 nautical miles from Atlantic City, New Jersey, at the edge of the continental shelf. The administrative designation of the 106-Mile Site expires on March 17, 1991.

Reports by the news media from 1973 to 1976 that marine life and water quality were threatened by ocean dumping, sparked public alarm and a call to end ocean dumping. Ocean pollution events during the summer of 1976, in particular, intensified public concern. EPA issued revised regulations in January, 1977, establishing December 31, 1981, as the deadline to end ocean dumping of sewage sludge that did not meet environmental criteria.

Congress subsequently amended the MPRSA in 1977 to prohibit dumping after December 31, 1981, of sewage sludge and industrial waste that would "unreasonably degrade" the marine environment. Based on its interpretation of the 1977 amendments, EPA issued New York City an interim permit that required the development of an alternative method to manage its sewage sludge by December 31, 1981. In 1979, New York City, two New York counties, and six New Jersey municipal authorities filed suit against EPA to stop the implementation of EPA's 1981 deadline, arguing that their sludge did not unreasonably degrade the environment and ocean dumping was environmentally preferable to land-based alternatives. The Federal District Court for the Southern District of New York ruled in favor of the municipalities, holding that the MPRSA required EPA to balance the economics of ocean dumping against land-based alternatives. (City of New York v. EPA, 543 F. Supp. 1084, S.D. N.Y. (1981).) EPA did not appeal the decision, and the nine dumpers who filed suit have been allowed to continue dumping under court order until the present time.

B. SUMMARY OF KEY PROVISIONS OF THE OCEAN DUMPING BAN ACT

The Ocean Dumping Ban Act (Act) was enacted in November 1988, partly in response to the serious incidents of garbage wash-ups on Mid-Atlantic beaches during the summer of 1988 and partly to close the gap created by the City of New York v. EPA decision, discussed above. Following is a summary of the Act's key provisions:

- * Prohibits ocean dumping of all sewage sludge and industrial waste after December 31, 1991.
- * Prohibits dumping after 270 days from enactment of the Ocean Dumping Ban Act, by August 14, 1989, if the dumper has not entered into a compliance or enforcement agreement and obtained a permit to dump from EPA. Prohibits new dumpers.
- * Requires a compliance agreement for a dumper who can cease ocean dumping by December 31, 1991, and waives the payment of dumping fees for those who enter into compliance agreements.
- * Requires an enforcement agreement for those who cannot cease dumping by December 31, 1991, and imposes significant fees and civil penalties for dumping after the deadline.
- * All dumpers must pay a $15 per dry ton fee to cover related costs of administration, monitoring and enforcement by EPA, NOAA and the Coast Guard.
- * As part of an enforcement agreement, dumpers must pay a per dry ton fee of $100 in 1989, $150 in 1990 and $200 in 1991. In 1992, civil penalties of $600 per dry ton commence and increase by 10% plus 1% for each year that dumping continues after 1991.
- * The dumpers must deposit 85% of the fees paid under an enforcement agreement into a trust account to be used exclusively to pay for the development and implementation of alternatives to ocean dumping. The balance of the fee is split 50-50 between a state Clean Oceans Fund and the state's water pollution control revolving fund created under title VI of the Clean Water Act (CWA).
- * Of the penalties, 90%, declining by 5% each year after 1992, are to be deposited into the dumper's trust account, with the balance split 50-50 between the state Clean Oceans Fund and the title VI CWA revolving fund.

Other provisions of the Act include a requirement for EPA, in cooperation with NOAA, to develop a program for monitoring environmental conditions at the 12-Mile and 106-Mile Sites and within the potential area of influence of sludge and industrial waste dumped at those sites; an enforcement monitoring report; a prohibition on disposal of sewage sludge at landfills on Staten Island; and a report on ocean discharges and their compliance with guidelines issued under section 403(c) of the CWA.

STATUS OF NEGOTIATIONS, MONITORING AND ENFORCEMENT

A. PROPOSED PERMITS, TERMS AND CONDITIONS

On March 24, 1989, EPA Region II issued a notice of intent to issue permits for continued dumping at the 106-Mile Site to nine municipal authorities. Under the proposed permits, one million more tons of sludge would be allowed to be dumped than the 8.4 million tons dumped in 1987. This reflects a number of upgraded sewage treatment facilities generating more sludge. (See Figure 2 for list of dumpers and annual tonnages.) The following are key terms and conditions of the proposed permits:

* The permits would be valid until March 17, 1991 when the administrative designation of the 106-Mile Site expires. (Dumping after that date would occur only pursuant to court-approved enforcement agreements.)

* The amount of sludge to be dumped at the Site is limited, and certain materials, such as radioactive wastes, floatables and medical waste, are prohibited.

* New, lower discharge rates are set to ensure compliance with EPA's limit on toxics. For example, due to the high metal content of its sludge, Passaic Valley must discharge its sludge at the rate of 420 gallons per minute at a barge speed of 6 knots.

* The permittees must conduct extensive monitoring to determine the nearfield fate and short-term effects of sludge dumping at the Site.

* A new system of vessel seals and manifests is required to prevent short dumping. In addition, each barge will carry an EPA-approved shiprider to monitor the dumping.

* Each barge must be equipped with a "black box" to allow electronic surveillance of its location and discharge rate by the Coast Guard's Ocean Dumping Surveillance System.

B. AGREEMENTS

In addition to issuing proposed permits, EPA has been negotiating the terms of the compliance/enforcement agreements required by the Ocean Dumping Ban Act. Each agreement must contain a plan for phasing out and terminating ocean dumping; a schedule for the design, construction, and full implementation of an alternative system for the management of sludge; requires the payment of applicable fees and penalties; authorizes the use of interim measures; and requires the signature of the Governor. In addition, each compliance agreement must result in the termination of ocean dumping by December 31, 1991.

EPA Region II has taken the position that to enter into a compliance agreement (allowing the waiver of dumping fees) the dumper must have in place and implement its *final* alternative system by December 31, 1991, not simply be relying on interim measures. As a result of this interpretation, all six New Jersey authorities have broken off negotiations and filed a lawsuit in the Federal District Court for the District of New Jersey seeking a declaratory judgment that they are entitled to a compliance agreement because they will end ocean dumping by the 1991 deadline. (*Passaic Valley Sewerage Commissioners, et al. v. Administrator of EPA, et al.*, C-89-1670, D.N.J., filed April 19, 1989.) The New Jersey authorities are proposing, as an interim measure, to build sludge dewatering facilities, then transport the sludge to out-of-state landfills, mainly in Pennsylvania. The long-term New Jersey solution is to build incinerators within the state by 1996.

According to recent press reports, Nassau and Westchester Counties, New York, will not join the New Jersey lawsuit, although their fees under enforcement agreements could amount to a total of $8.8M and $4.9M, respectively, through 1991. These counties have entered a joint venture that they hope will allow them to sell their sludge on the private market for eventual use as a fertilizer or compost. The final alternative will not be in place, however, until the end of 1994.

Negotiations over the terms of an enforcement agreement are ongoing with New York City (NYC). For the short term, NYC may construct dewatering facilities at its sewage treatment plants and landfill the sludge. Under this scenario, NYC could cease ocean dumping of 20% of its sludge by December 31, 1991, with the rest out by June 30, 1992. NYC has not yet identified its final alternative, which probably will not be fully implemented until 1998. The City will have to pay about $46M in dumping fees through 1991.

C. MONITORING PROGRAM AND INSPECTOR GENERAL'S REPORT

Under the MPRSA, NOAA is assigned the responsibility for monitoring the effects of wastes dumped into the ocean, and for continuing research programs on long-range effects of pollution and human-induced changes in the marine environment. The MPRSA also authorizes EPA to develop disposal alternatives or minimize or end ocean dumping of material that may unreasonably degrade or endanger human health or the marine environment.

NOAA, acting through its Northeast Monitoring Program (NEMP), has conducted an ongoing monitoring program of the waters from the Gulf of Maine to North Carolina's Cape Hatteras, which includes monitoring in the New York Bight. Since the cessation of sewage sludge dumping at the 12-mile dumpsite, NOAA's Northeast Fisheries Center has developed a study to restore the

12-mile dumpsite area.

The Ocean Dumping Ban Act requires EPA, in cooperation with NOAA, to design and conduct an environmental monitoring program of the 12-mile dumpsite, the 106-Mile Site, the acid waste dumpsite, and the potential area of influence of the waste dumped at those sites. The plan must include biological sampling and the use of satellite and other advanced technologies. EPA and NOAA are also required to submit to Congress the actual monitoring plan by November 18, 1989, and report annually on the results of the monitoring conducted under the plan.

On March 27-30, 1989, EPA, NOAA and the Coast Guard held a joint workshop in Ocean City, New Jersey, on the development of a monitoring plan for ocean dumping of sewage sludge at the 106-Mile Site. Approximately 100 scientists, federal and state officials, representatives of the fishing industry, and the environmental community participated in the workshop. The objective of the workshop was to have the participants provide recommendations to the agencies on the development of a monitoring plan.

The results of the workshop are intended to be used to refine EPA's ongoing monitoring program and to respond to the requirements of the Ocean Dumping Ban Act. To date, EPA has implemented only the first two tiers of a four-tier monitoring program. Tier 1 includes the determination of sludge characteristics and disposal operations; tier 2 analyzes nearfield fate and short-term effects; tier 3 analyzes farfield fate; and tier 4 analyzes long-term effects. Existing information from tier 1 and tier 2 is being used to revise and set allowable dumping rates on a quarterly basis. EPA began gathering data for tier 3 in September 1988, on ocean currents traveling through the site. Tier 4 data gathering is not projected to begin until some time in Fiscal Year 1990.

On March 31, 1989, EPA's Office of the Inspector General issued a report critical of EPA's monitoring activities for the 106-Mile Site. This report was based on an investigation that was carried out from August 1988 through January 1989.

The IG's report reiterated concerns by some scientists that EPA's tiered monitoring approach is flawed, and that it was not subjected to formal scientific peer review. The report also faulted EPA for not developing contingency plans to deal with possible emergency situations and for not having provisions to curtail dumping when currents could draw the sludge toward the shore and fishing canyons. The IG recommended that EPA convene a panel of scientific experts to help set priorities for monitoring needs; reduce discharge rates so that toxicity levels are not exceeded; develop contingency plans; augment personnel devoted to monitoring; and obtain necessary equipment.

D. ENFORCEMENT

The Coast Guard has principal responsibility for ocean dumping surveillance. The agency is carrying out this responsibility through use of the electronic Ocean Dumping Surveillance System (ODSS). All 16 barges carrying sludge to the 106-Mile Site are required, and have installed, "black boxes" as part of the ODSS. The Coast Guard is moving its antennas to the top of the World Trade Center, New York City, to enable better, long-range monitoring of the site.

The ODSS is not installed, however, on feeder barges carrying sludge within harbors and bays. Thus, episodes of short dumping within harbors are not detectable by the Coast Guard. The New Jersey Attorney General's Office is currently prosecuting a case of short dumping in Newark Bay by the principal New Jersey barge company, General Marine Transport Company.

EPA-proposed shipriders on each barge will enable first-hand observation of discharge rates and locations. Seals on barge valves and a manifest system should provide further protection against short dumping.

E. TERMINATION OF INDUSTRIAL DUMPING

No industrial waste is now dumped at sea. Previously, industrial dumping occurred at two sites, the acid waste dumpsite located approximately 15 nautical miles east of Long Branch, New Jersey, and the deepwater industrial dumpsite located within the 106-Mile Site.

Prior to 1973, over 300 industrial companies dumped an estimated 4.6 million wet metric tons of waste into the ocean. By 1987, the numbers had fallen to three: DuPont-Grasselli, DuPont-EdgeMoor, and Allied Signal.

DuPont-Grasselli ceased its ocean dumping activities by December 31, 1986, when its permit expired. It had dumped alkaline wastes from 1968 to 1973 at the acid waste dumpsite and from 1968 to 1987 at the deepwater industrial dumpsite. DuPont-EdgeMoor had dumped iron chloride acid wastes at the deepwater industrial dumpsite from 1968 to 1987. However, in response to public and political pressures, DuPont-EdgeMoor withdrew its permit renewal application on July 13, 1988.

Allied Signal's permit to dump diluted hydrochloric acid at the acid waste dumpsite expired in September 1988. Prior to the enactment of the Ocean Dumping Ban Act, EPA reached a tentative agreement with the company to end its ocean dumping practices by January 31, 1991. Allied Signal determined that it was unable to meet the proposed permit conditions. As a result, the company rearranged its production system so that it was no longer necessary to dump acid wastes into the ocean.

DEVELOPMENT OF ALTERNATIVE SYSTEMS

The Ocean Dumping Ban Act requires each dumper to design, construct and fully implement an alternative system for the management of sewage sludge. An alternative system is one that does not require a permit under the MPRSA. Since ocean incineration, for example, requires a permit under MPRSA, it would not be an acceptable alternative.

The dumpers have been looking at many different alternatives, from simple methods such as landfilling or composting, to high technology systems that convert sludge into useful and marketable commodities such as fuel oil.

The companies that have been invited to testify all have developed proven technologies for the reuse of sludge. Some of these companies have had discussions with the dumpers about their technology, others have not. Some of these companies also may have problems meeting state and local environmental regulations in certain geographic locations.

Oxidyne Corporation uses a technology called "deepwell wet oxidation". They are currently under contract to Houston, Texas, eventually to process 40 dry tons per day of sludge. The procedure requires the drilling of a 5,300 foot deep, 21" wide hole which will be encased with nickel-alloy piping. There, a "continuous flow process," similar to a pressure cooker turns sewage sludge into water, carbon dioxide and ash. In addition, energy is produced for other uses.

Battelle/Innotek has developed a process to convert sludge into fuel oil. The Sludge to Oil Reactor System combines alkali with primary sludge, and heats the mixture under pressure to convert it to crude oil. The crude is further upgraded to create an odor-free fuel oil similar to Number 4 diesel fuel. There is a pilot plant in Richland, Washington.

Dehydro-Tech Corporation of East Hanover, New Jersey, uses the oil immersion dehydration sludge drying process, known by the trade name "Carver Greenfield". This is basically an upgraded method of composting. The dried product can be used for fertilizer, or burned to produce heat energy. The company is concerned about meeting state permit requirements to fully implement its technology in New Jersey.

Kubota America Corporation is attempting to market their technology which is widely used in Japan. This technology consists of a sludge melting furnace which produces a ceramic-like slag. The slag is used in Japan to manufacture items such as ceramic tiles and macadam for tennis courts. The company is constructing their first plant in the United States. Their Monticello, New York, facility will process all of the city's sludge, and the slag will be used as bedding for new sewer pipes being installed throughout the city.

RELATED LEGISLATION

H.R. 1469 (Hughes, Saxton, Pallone) - amends the MPRSA to increase the criminal penalties to five years imprisonment and felony-level fines.

H.R. 1281 (Gejdenson and various cosponsors) - amends the MPRSA to authorize the seizure and forfeiture of vessels used to violate the Act.

ISSUES

Following are some issues that may be raised during the oversight hearing:

* Why is EPA requiring the New Jersey dumpers to enter into enforcement agreements?

* What will EPA do if the New Jersey dumpers have not entered into agreements by the August 14, 1989, deadline?

* What assurance do the New Jersey dumpers have that they will be able to transport their sludge to out-of-state landfills? Do they have any written agreements with operators of out-of-state landfills?

* When do the New York State dumpers expect to cease ocean dumping? What alternatives are they considering?

* What assistance have New York DEC and New Jersey DEP given the dumpers to identify alternatives? Have New York and New Jersey established Clean Oceans Funds as required by the Act?

* How does EPA respond to the recent IG's report, which is critical of its monitoring program?

* When do EPA and NOAA expect to have their joint monitoring program in place? Can this program be started prior to receipt of the ocean dumping fees?

* How can we be assured that there will not be any more instances of short dumping?

* How will the new discharge rates be monitored? What are the expected costs of complying with the new discharge rates? Will the discharge rates meet the toxicity standards of the EPA regulations and protect the environment at and near the 106-Mile Site?

* Are the dumpers proposing to use alternatives that are environmentally sound and make beneficial use of the sludge?

- What effect will the New Jersey lawsuit have on implementation of the Ocean Dumping Ban Act?

Attachments

Figure 1

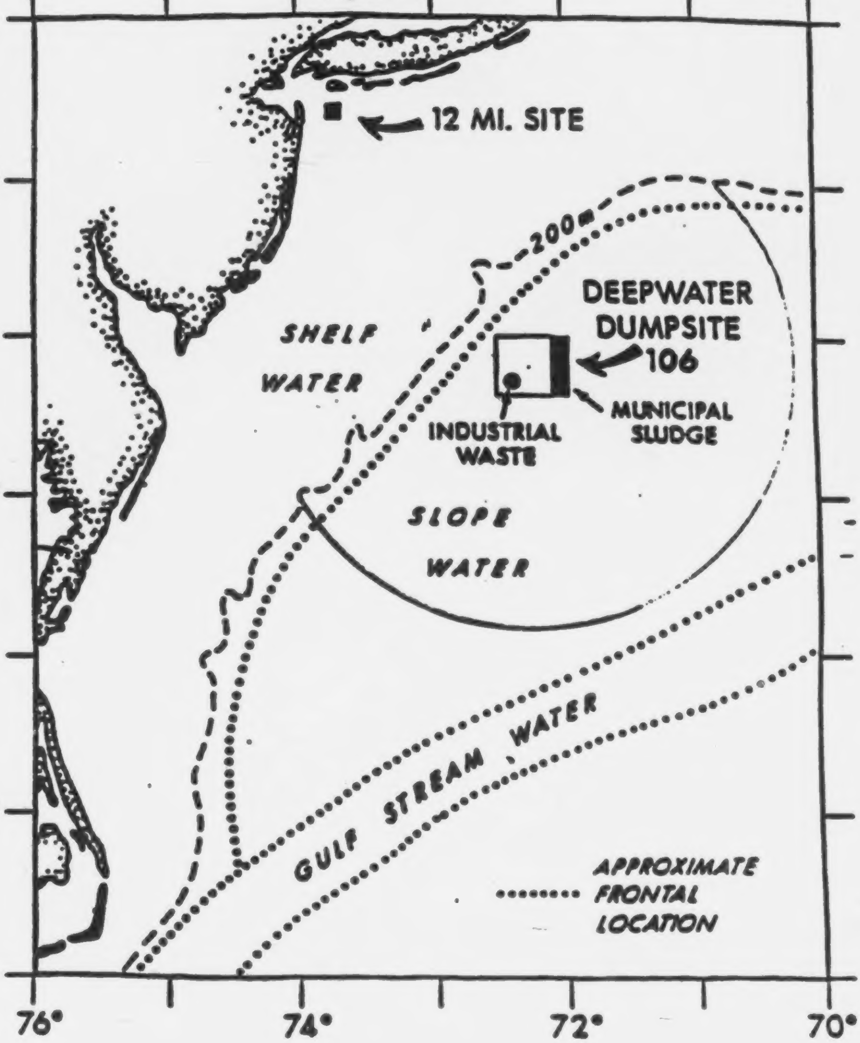
12 MI. SITE
40°
200m
DEEPWATER
DUMPSITE
106
SHELF
WATER
INDUSTRIAL
WASTE
MUNICIPAL
SLUDGE
38°
SLOPE
WATER
GULF STREAM WATER
36°
APPROXIMATE
FRONTAL
LOCATION
76°
74°
72°
70°

Chart showing the 12 and 106 Mile Dumpsites in relation to the average locations of water masses in the New York Bight Region, and the area considered to be the "vicinity" of the 106 Mile Dumpsite (semi-circle). From Barton, 1987.

FIGURE 2

DUMPING AUTHORITIES AND ANNUAL TONNAGES

Permittee	Annual Dry Tons	Annual Wet Tons
NYC	120,888	4,558,694
Passaic V.	96,016	1,400,000
Middlesex	40,741	1,001,001
Nassau	22,995	919,800
Bergen Co.	14,180	430,000
Joint Mtg.	13,293	400,400
Westchester	12,841	513,640
Rahway V.	5,701	169,169
Linden-Roselle	2,502	100,100

TESTIMONY OF
WILLIAM J. MUSZYNSKI
ACTING REGIONAL ADMINISTRATOR, REGION 2
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON OCEANOGRAPHY AND THE GREAT LAKES
SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES
HOUSE OF REPRESENTATIVES

May 16, 1989

Good afternoon, I am William J. Muszynski, Acting Regional Administrator of the U.S. Environmental Protection Agency (EPA), Region 2. Our Region includes the States of New York and New Jersey, Puerto Rico and the U.S. Virgin Islands. I am accompanied today by Tudor Davies, Director of the Office of Marine and Estuarine Protection at EPA Headquarters. We are pleased to be here today and we thank the Subcommittees for the opportunity to discuss EPA's implementation of the Ocean Dumping Ban Act of 1988 (Ban Act).

I am also pleased to inform you that since passage of the Ban Act EPA has been conducting a vigorous effort not only to carry out its provisions, but also to keep Congress and the public informed of our progress. We are well along in the process of developing the permits and phase-out agreements that lead to the end of dumping called for in the Ban Act; we conducted four public meetings on the implementation of the Ban Act in February 1989, four public hearings on the proposed permits in April 1989, and briefed interested Congressional staff on February 10 and April 17 of this year.

My testimony today will address the status of our efforts to finalize enforcement agreements and permits toward the elimination of ocean dumping of sludge, to discuss land-based alternative to ocean dumping, to increase monitoring at the 106-Mile Site, to prepare a Report to Congress regarding implementation of marine discharge criteria for sec. 403(c) of the Clean Water Act (CWA), and to de-designate the Deepwater Industrial Waste Site.

Enforcement Agreements

As you are aware, the Ban Act set forth a stringent timeframe to end the ocean dumping of all sludge. But it also prohibits dumping nine months after its passage--on August 14, 1989--unless the dumpers have both a permit and a compliance/ enforcement agreement signed by the dumpers, their respective State, and EPA.

In December 1988, EPA and the States met with the nine remaining municipal ocean dumpers to explain the Ban Act's requirements and to request the submittal of phase-out schedules from each of them. The dumpers submitted preliminary schedules in January 1989. EPA in concert with the U.S. Department of Justice (DOJ), U.S. Attorney Offices, New Jersey Department of Environmental Protection (NJDEP), and New York State Department of Environmental Conservation (NYSDEC), initiated negotiations in February 1989 with each of the ocean dumpers. Discussions have continued on the details of the interim and alternative (long term) schedules, as well as on the specific provisions and language of the enforcement agreements, which were initially drafted by EPA.

EPA, in cooperation with the Justice Department, has elected to enter these enforcement agreements as judicial consent decrees in order to ensure strict oversight and enforcement of the phase-out schedules.

Negotiations are continuing with New York City, Westchester County, and Nassau County and we hope that agreements will be reached soon. However, the New Jersey dumpers refused to continue negotiations in late March and filed suit against EPA and the State of New Jersey on April 19, 1989, requesting judicial review of EPA's interpretation of use of enforcement agreements instead of compliance agreements. Although that suit is not settled, on May 12, 1989 we resumed negotiations with them on the phase-out schedule.

Proposed Permits

On March 24, 1989, EPA announced its tentative decision to issue ocean dumping permits to the nine New York and New Jersey municipalities. The public notice, Basis of Tentative Determination, and proposed permits were mailed to over 3,000 interested agencies, environmental groups, and private citizens. Eight public hearing sessions were held at four locations (two in New York and two in New Jersey) during the week of April 24th. The public comment period ended on April 28, 1989.

Our current timetable calls for the hearing officers report and recommendations to be submitted to me, as the Acting Regional Administrator, by June 15, 1989. This will be followed by a final determination by July 14, 1989. Permits would become effective on or before August 14, 1989 assuming no request for an adjudicatory hearing is filed or, if one is filed, it is denied.

EPA tentative permits have been developed to ensure compliance with the Ban Act and EPA's Ocean Dumping Regulations. Some of the more significant conditions include: First, based upon EPA's monitoring at the Site, the proposed discharge rates for sludge disposal have been significantly reduced from 15,500 gallons per minute (gpm), to proposed rates ranging from 8,719 to 145 gpm, depending upon the toxicity of the applicant's sludge. Some of the dumpers have questioned the proposed rates and their feasibility. Second, a sludge manifest system will be required which has been developed to provide additional surveillance of sludge loading and transfer operations from the waste water treatment plants through ocean disposal. This manifest system includes oversight by EPA-approved inspectors, and use of EPA- supplied discharge valve seals and manifest forms. New York City and Nassau County have voluntarily reduced their discharge rates by one-half and are implementing the new sludge manifest system. Third, each sludge barge is required to have the Ocean Dumping Surveillance System (ODSS) or "black box" installed and operational prior to departure for the Deepwater Municipal Sludge Dump Site (DMSDS), formally referred to as the 106-Mile Site. Currently, all sixteen vessels authorized to use the Site are equipped with the black box units. Fourth, an EPA-approved shiprider, provided at the sludge dumpers' expense, will provide surveillance for each ocean disposal trip. Fifth, the permittees are required to assist EPA in implementing an extensive four-tiered monitoring plan. Sixth, in order to ensure proper separation between barges, EPA has designated a discharge trackline pattern at the Site that the barges will be required to follow during dumping operations.

In addition, a condition in the proposed permits limits the maximum combined total of sludge to be ocean dumped to 9.5 million wet tons annually. This increase (approximately .75 million wet tons) from quantities currently being dumped is primarily the result of upgrading wastewater treatment facilities under the Clean Water Act. An annual limit of sludge for each applicant is also listed in the proposed permit.

Alternatives to Ocean Dumping

The four major land-based alternatives to ocean dumping for sludge disposal or reuse currently available are land application, distribution and marketing of sludge products, landfilling, and incineration. About 25% of the nation's sludge is now applied on agricultural, forest, disturbed or dedicated lands. Land application uses sludge as a soil conditioner and partial replacement for chemical fertilizers.

Distribution and marketing of sludge products is a rapidly expanding alternative, and encompasses 9% of the nation's sludge. Like land application, this option takes advantage of sludge's ability to improve soil productivity.

About 45% of the nation's sludge is landfilled either alone or with solid waste. Sludge is facing increasing competition with solid waste for available landfill space.

Finally, about 21% of the nation's sludge is incinerated. Incineration converts sludge into ash, greatly reducing the volume and mass of residual solid materials which must then be landfilled, and can include energy recovery.

Alternatively, sludge generated in New York State is disposed of in the following manner: 41% ocean dumping, 27% incineration; 26% landfilling, 5% land application and composting, and 1% other. Sludge generated in New Jersey is disposed of in the following manner: 50% ocean dumping, 18% incineration, 18% out of state, 11% land application, and 3% other. New York and New Jersey each produce about 2 million dry pounds of sludge per day.

The applicability of a sludge disposal alternative depends on many factors, including sludge quality and quantity, economics, public acceptance, and environmental regulations. EPA promotes those alternatives that provide for the beneficial use of sludge while maintaining or improving environmental quality and protecting public health.

While the Ban Act established December 31, 1991 as the date by which ocean dumping of municipal and industrial waste must stop, New Jersey statute establishes March 17, 1991 as the date by which all New Jersey authorities must end the ocean dumping of sludge.

To meet this requirement the New Jersey dumpers have proposed the following:

Passaic Valley Sewerage Commission (PVSC), Bergen County Utilities Authority (BCUA), Joint Meeting of Essex and Union Counties, and Rahway Valley Sewerage Authority (RVSA) propose to use the interim alternative of dewatering and out-of-state landfilling. Linden Roselle Sewerage Authority (LRSA) proposes to use an existing in-state municipal sludge incinerator. As a long-term alternative, each of these proposes to build incinerators, on site, except that RVSA will go to a proposed "Joint Meeting of Essex and Union Counties" incinerator. Middlesex County Utilities Authority (MCUA) proposes to chemically treat the sludge and use the stabilized material as a landfill cover on both an interim and long-term basis.

Based on this strong interest in incineration, EPA, NYSDEC, and NJDEP plan to conduct air studies of potential cumulative regional air quality impacts from all types of existing and proposed incinerators.

The three New York ocean dumpers are searching out private vendors to implement interim measures for disposing of dewatered sludge. Each is still in the process of studying the full range of technologies available, including the latest innovations, for appropriateness to its individual situation as a long-term solution.

Westchester County has informed us they intend to be out of the ocean by the December 31, 1991 federal deadline. Nassau County has said that 50% of its sludge can be out by December 31, 1991 and the remainder by June 1992. New York City intends to remove 20% by the deadline and the remainder by June 1992. In general, the long-term alternatives will take between 1995 and 1998 to fully implement. I would like to point out that these dates and alternatives are still being negotiated with the dumpers.

Monitoring

Since 1984, EPA has conducted eight surveys at and in the vicinity of the 106-Mile Site. In 1986 EPA developed a comprehensive monitoring plan for the 106-Mile Site, and began implementation. The monitoring plan describes the regulatory basis for monitoring, and how site and waste characterization are used to predict possible impacts of sludge disposal.

Monitoring for regulatory compliance and environmental impacts of sludge disposal has been organized into a tiered implementation framework. The four tiers include (1) Sludge Characteristics and Disposal, (2) Nearfield Fate and Short-Term Effects, (3) Farfield Fate, and (4) Long-Term Effects. The Ban Act requires EPA, in cooperation with NOAA, to design a monitoring program for the mid-Atlantic bight by November 1989. The monitoring plan is required to include (1) sampling of an appropriate number of fish and shellfish species and other organisms to assess the effects of environmental conditions on living marine organisms in these areas;

and (2) use of satellite and other advanced technologies in conducting the program.

In response to the Ban Act requirements and in an effort to enhance the already existing strategy, EPA, NOAA, and the U.S. Coast Guard convened a workshop in March 1989, to address concerns about potential impacts on fisheries and human health of disposing of sludge at the 106-Mile Site and to help identify critical monitoring, research, and surveillance needs relative to the 106-Mile Site. Representatives from federal agencies and State governments, the scientific and technical community, citizen groups, Congressional staffs, and sewerage authorities participated in the workshop.

The workshop participants confirmed additional needs, and recommended strategies for conducting monitoring, research, and surveillance activities at the 106-Mile Site. Draft agreement was reached on the following points: (1) Based on the toxicity of sludge to marine organisms, dumping rates should be substantially reduced. (2) There is no evidence from existing studies that dumping of sewage sludge at the 106-Mile Site poses a threat to human health, either directly, or indirectly through the consumption of seafood. (3) There is no information to suggest that seafood from the Mid-Atlantic Bight is unsafe because of dumping at the 106-Mile Site. (4) Existing studies have found no measurable effects on living resources that have been related to dumping at the 106-Mile Site. (5) Based on existing studies, sludge is unlikely to impact the shelf or move onto beaches.

General recommendations resulting from the workshop include the need: (1) To expand the existing monitoring efforts at the 106-Mile Site to include monitoring the movement of sludge away from the Site and the possible effects on fish and shellfish. (2) To increase the monitoring of the quality of fish and shellfish from the area to ensure that the supply of seafood remains wholesome. (3) To conduct additional research and monitoring on fish and shellfish away from the Site. (4) To conduct additional physical oceanographic measurements to determine better the movement of sludge away from the site.

On March 31, 1989 EPA's Inspector General's Office released a copy of its final report on its review of monitoring activities for the 106-Mile Site. The review was performed from August 1988 through January 1989. The report questions monitoring and management of municipal sludge dumping at the 106-Mile site.

Specifically, the Inspector General recommended the following: (1) The agency should establish a panel of scientific experts to be drawn from federal, private and academic institutions, who will prioritize monitoring needs and make recommendations as to the allocation of budgeted resources to meet these needs. (2) Efforts should be continued to reduce discharge rates so that toxicity thresholds, established in Ocean Dumping Regulations, are not exceeded. (3) Contingency plans should be developed which can be readily implemented in the event that actual or imminent danger to the marine environment is linked to sludge dumping. (4) Federal manpower resources devoted to the ocean disposal monitoring program should be augmented to better manage and coordinate the site monitoring activities. (5) A program for exchange of equipment should be developed, or additional resources provided to obtain equipment necessary for adequate monitoring of ocean dumping. (6) a program for the exchange of scientific information and coordination of research for the 106-Mile site should be developed and implemented. We are in the process of developing our formal response to the Inspector General's recommendations.

For the most part, the Inspector General's recommendations are sound and were in fact already being implemented at the time that the audit was being performed. More specifically: (1) EPA, NOAA and the USCG recently convened the above-mentioned 106-Mile Site Workshop to pull together national experts for the purpose of addressing concern about potential environmental and human health impacts. (2) New lower discharge rates based on the toxicity of the various sludge to marine organisms have already been included in EPA Region II's proposed sludge dumping permits. (3) We do not believe that any action--enlarging the site or designating a second sludge dumping site--is needed since we have authority to modify or even revoke permits if actual or imminent danger were to be found. Participants attending the March 1989 106-Mile Site Workshop concluded, based on available information, that sludge dumping at the 106-mile site does not pose a threat to the marine environment or to human health. (4) The Ban Act provides fees collected from the municipal dumpers to augment future EPA and NOAA monitoring activities planned for the 106-Mile Site. (5) A Memorandum of Understanding is currently being developed to coordinate use of manpower and equipment, including ships, by the various federal Agencies presently involved with the monitoring of the 106-Mile Sites. (6) In follow-up to the 106-Mile workshop, we are developing a surveillance and monitoring strategy and will provide peer review opportunities for those interested in the monitoring plan and its implementation. In addition, EPA will increase efforts to assure that future monitoring results will be available for review by the public. Our resulting monitoring program will be presented in a Report to Congress due this November, 1989.

Deepwater Industrial Waste Site

EPA is currently pursuing the de-designation of two ocean disposal sites, the Deepwater Industrial Waste Site located approximately 106 miles offshore of Cape May, New Jersey, and the Acid Waste Disposal Site located 15 miles offshore of Long Branch, New Jersey. There are currently no permittees utilizing either site. Therefore, the need for the sites has been eliminated.

The Deepwater Industrial Waste Site was last used in March 1987. Permit reapplications by the last two permittees were withdrawn due to the feasibility of land-based alternative disposal methods. The Acid Waste Disposal Site was last used in September 1988. The last remaining permittee withdrew its permit reapplication due to the claimed impracticability of continuing ocean disposal in compliance with the more stringent volume and discharge rates derived through use of an updated biological testing protocol.

The Agency is preparing Proposed Rules recommending the de-designation of both sites, as well as others.

Clean Water Act Section 403(c)

As required in the Ban Act, EPA is preparing a report on the implementation of sec. 403(c) of the Federal Water Pollution Control Act. Sec. 403(c) is applicable only to those NPDES permits that are issued for outfalls located seaward of the baseline, which is the inner boundary of the territorial sea and has been defined as the height of ordinary low tide. The inventory of discharges subject to the 403(c) Ocean Discharge Criteria has identified 305 discharges from industry and publicly-owned treatment works. A determination of approximately 300 additional discharges is pending on the delineation of the baseline in coastal areas such as Maine, Alaska, and the Florida Keys, due to their irregular coastlines. Options for implementation of the 403(c) program, resources needed, and a schedule are being discussed within the Agency at this time. We are slightly behind the schedule in the Ban Act but expect to submit the report to Congress this summer.

EPA will implement the Ocean Dumping Ban Act to every extent possible regardless of the challenging statutory deadlines and uncertainties which I have shared with you today.

Mr. Chairman, this concludes my presentation. Thank you for your attention and the opportunity to be here today. I would be happy to respond to any questions you may have.

STATEMENT OF
THOMAS MAGINNIS
ASSISTANT ADMINISTRATOR FOR OCEAN SERVICES AND COASTAL ZONE MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

BEFORE THE

SUBCOMMITTEE ON OCEANOGRAPHY AND GREAT LAKES
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION AND ENVIRONMENT
COMMITTEE ON MERCHANT MARINE AND FISHERIES

U.S. HOUSE OF REPRESENTATIVES

MAY 16, 1989

Mr. Chairmen and Members of the Subcommittees:

Thank you for the opportunity to discuss the National Oceanic and Atmospheric Administration's (NOAA) activities related to implementation of Pub. Law 100-688, the Ocean Dumping Ban Act (ODBA) of 1988. NOAA is working very closely with the Environmental Protection Agency (EPA) and the Coast Guard in implementing Title I of the Act. It's a pleasure to report that the efforts of the three agencies have been very cooperative and effective. Interactions between EPA and NOAA concerning sewage sludge dumping at the 106-mile site actually started several months prior to passage of the ODBA; the Coast Guard became fully involved soon after the ODBA was passed.

The Act requires renewed attention by EPA, the Coast Guard, and NOAA to all ocean dumping activity (except disposal of dredged materials) in the Middle Atlantic Bight. A series of actions has been initiated by the three agencies to ensure effective and coordinated implementation of the Act. Our initial efforts are focused on sewage sludge dumping at the 106-mile site. Future efforts will address other ocean dumping in the Bight (dumping that occurs in the more geographically-limited New York Bight and its Apex -- the terminus surrounding the entrance to the New York-New Jersey Harbor).

NOAA, EPA, and the Coast Guard recently sponsored a joint workshop on sewage sludge dumping at the Middle Atlantic Bight 106-mile site. The workshop, held March 28-30, 1989, in Ocean City, New Jersey, considered transport and fate of the dumped materials, their effects on living marine resources and human health, and options available for permitting and site designation.

Attendees at the workshop included representatives from Federal and State agencies, the scientific and technical community, citizen groups, Congressional staff, and the nine sewerage authorities currently dumping at the 106-mile site. Workshop participants provided recommendations to the three agencies concerning management strategies for research, monitoring, and surveillance associated with the site -- both near the site and away from the site. The products of the workshop are:

- o A report that addresses the following major issues:
    - * The transport of sewage sludge from the site, and the chemical and physical processes that affect the fate of the sludge;

* The effect of the sewage sludge on living marine resources;

* The effect of the sewage sludge on human health; and

* Changes in the site designation or permits that would provide increased protection of human health, the marine environmental quality, and living marine resources.

o A recommendation for strategies to resolve technical uncertainties and public perceptions that affect site management.

Using the workshop recommendations, EPA, the Coast Guard, and NOAA are developing an overall strategy and a detailed implementation plan for further research, monitoring, and surveillance related to sewage sludge dumping at the 106-mile site. The joint strategy, already in draft form, is undergoing further development and refinement by the three agencies. That draft is being used to initiate development of the joint work plan. Elements of the plan will be implemented by EPA, the Coast Guard, and NOAA through each agency's ongoing programs. The strategy and plan are focused on the same four major issues that were addressed in the workshop.

The three agencies are preparing a memorandum of agreement (MOA) concerning the work to be done jointly. The MOA will probably be signed in conjunction with publication of the joint strategy for further research, monitoring, and surveillance. The scope of the MOA will address the issue designated for special attention in the ODBA, i.e., sewage sludge dumping at the 106-mile site. The three agencies are now discussing a second

MOA that would be larger in scope, addressing all matters identified under the ODBA.

NOAA will implement its activities in the work plan with funds received (starting early November 1989) from the ocean dumping fees imposed under the ODBA. These new NOAA activities will complement other NOAA efforts that are underway or planned, and build upon NOAA's already extensive and impressive accomplishments in ocean dumping research and monitoring. Let me highlight some of NOAA's recent findings.

Deaths of unprecedented numbers of dolphins within sight of bathers along east coast beaches from early June 1987 to March 1988 alarmed the general public and focused perceptions on waste disposal in the Middle Atlantic Bight. Evidence suggests that the dolphins were poisoned by brevetoxin, a neurotoxin produced by the dinoflagellate Ptychodiscus brevis, Florida's red tide organism. The dolphins were most likely weakened by the ingestion of brevetoxin and eventually became infected by a host of bacterial and viral infections. Though dumping at the 106-mile site cannot be linked to these mammal deaths, the site has become symbolic of all coastal pollution problems.

NOAA regularly conducts bottom trawl surveys for fisheries assessment that include the Middle Atlantic Bight. Primary interests are the distribution and abundance of principal bottom dwelling/demersal finfish. However, NOAA scientists do record overt symptoms of fish diseases and other pathological indicators. Data from the most recent survey, conducted by the NOAA Ship DELAWARE II, are compiled and available in Fishermen's Report, Cape Hatteras Western Scotian Shelf, 27 February -13 April 1989.

Another recent NOAA report addresses disease in fish and shellfish in the Middle Atlantic Bight. While natural populations of shellfish, especially lobsters and certain crab species, have been reported with significant disease, there is no indication that specimens obtained from the general areas of the 106-mile site have shown any unusual disease symptoms, either in kind or amount. NOAA scientists have not, based on present information, attributed shellfish diseases directly to ocean dumping at the 106-mile site.

NOAA has been conducting a study of recovery of conditions at the 12-mile ocean dump site in the New York Bight. The degree and rate of reovery there have implications for dumping at the 106-mile site. Dumping of municipal sewage sludge into the New York Bight began in the 1920s, at a site 12 miles southeast of the entrance to New York-New Jersey Harbor. In 1984, concerned about conditions at the 12-mile site, EPA designated the 106-mile site for all future sewage sludge disposal; in 1985, EPA denied petitions to redesignate the 12-mile site. As of December 31, 1987, all dumping of sewage sludge was terminated at the 12-mile site.

NOAA published in December 1988 a second progress report on its site recovery study. Since 1987, when the reduction in the volume of sludge dumped at the 12-mile site began (as dumping was shifted to the 106-mile site), the concentration of dissolved oxygen in bottom waters has remained above 4 milligrams per liter during summer months. Before the reductions in dumping began, values of less than 0.5 milligrams per liter were often measured in summer. During the same period, concentrations of contaminants, including toxic trace metals, have decreased. In addition, seabed oxygen consumption (uptake) rates have decreased significantly. They are now similar to rates measured in coastal areas that have not been influenced by sewage sludge dumping. A pollution indicator species, the worm capitella, has declined in number in the vicinity of the 12-mile site, indicating a positive change in community organisms with the reduction of pollution inputs there.

In response to FY 1989 Congressional budget direction, NOAA has initiated some research activities to examine impacts of ocean dumping on commercially important resources and habitats at the 106-mile site. NOAA is analyzing results from samples taken during 16 inspection dives in the area from Block Island to the Hudson Canyon and along the continental slope of the New York Bight.

The objective is to help characterize the biota and microhabitats of the region. Analyses of the infaunal community and sediment chemistry are underway. A full report should be ready by August 1989. A series of additional dives, using the Alvin and Johnson Sea-Link systems, is planned for September 1989 in the vicinity of the 106-mile site. Studies will be conducted on colonization and feeding of organisms at 2,250-2,750 meter depth. These studies will be conducted in the context of the strategy and plan for additional research, monitoring, and surveillance at the 106-mile site that are being prepared jointly by EPA, the Coast Guard, and NOAA.

Mr. Chairman, this concludes my testimony. I will be happy to respond to any questions that you or members of the Subcommittees may have.

TESTIMONY OF THOMAS C. JORLING
COMMISSIONER, NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BEFORE
THE HOUSE SUBCOMMITTEE ON
OCEANOGRAPHY AND THE GREAT LAKES,
THE HOUSE SUBCOMMITTEE ON OVERSIGHT AND
INVESTIGATIONS, AND
THE HOUSE SUBCOMMITTEE ON
FISHERIES AND WILDLIFE CONSERVATION
AND THE ENVIRONMENT

MAY 16, 1989

GOOD AFTERNOON. I AM THOMAS C. JORLING, COMMISSIONER OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION. I APPRECIATE THIS OPPORTUNITY TO ADDRESS YOU TO REPORT ON THE PROGRESS MADE BY NEW YORK STATE AND ITS COMMUNITIES TOWARD ACHIEVEMENT OF THE GOALS SET FORTH IN P.L. 100-688, "THE OCEAN DUMPING BAN ACT OF 1988".

ON FEBRUARY 23, 1988, LANGDON MARSH, THE EXECUTIVE DEPUTY COMMISSIONER OF MY DEPARTMENT PRESENTED TESTIMONY BEFORE YOU WHICH ADDRESSED NEW YORK STATE'S CONCERNS REGARDING THE IMPORTANT ISSUE OF THE OCEAN DISPOSAL OF SEWAGE SLUDGE AND REFLECTED UPON THE WIDE SPECTRUM OF RELATED ENVIRONMENTAL, ECONOMIC AND NATURAL RESOURCE ISSUES ASSOCIATED WITH THIS TOPIC. THESE ISSUES REMAIN AS VALID TODAY AS THEY WERE LAST YEAR. THE COMPLEX CONCERNS WHICH RESULTED IN THE LONG TERM PRACTICE OF OCEAN DUMPING OF SEWAGE SLUDGE MUST NOW BE ADDRESSED AND OVERCOME, WITHOUT REGARD TO THE SHORTCOMINGS OF PREVIOUS EFFORTS TO END OCEAN DISPOSAL, AND THEY WILL BE.

PURSUANT TO THE MANDATE OF THE OCEAN DUMPING BAN ACT, NEW YORK STATE, ALONG WITH FEDERAL AGENCIES, HAVE ENGAGED IN INTENSIVE NEGOTIATIONS WITH THE NEW YORK COMMUNITIES WHICH CURRENTLY DISPOSE OF

THEIR MUNICIPAL SEWAGE SLUDGE THROUGH OCEAN DUMPING. THESE NEW YORK COMMUNITIES ARE NEW YORK CITY, NASSAU COUNTY AND WESTCHESTER COUNTY.

I AM CONFIDENT THAT THE RESULT OF THESE NEGOTIATIONS WILL BE ENFORCEMENT AGREEMENTS WHICH ARE AUTHORIZED BY THE ACT FOR DUMPERS WHICH CANNOT GUARANTEE MEETING THE DECEMBER 31, 1991 GOAL FOR CESSATION OF OCEAN DUMPING ESTABLISHED IN THE ACT. ALTHOUGH THE OBSTACLES TO IMPLEMENTING ALTERNATIVE SLUDGE DISPOSAL METHODS ARE CONSIDERABLE, EACH ENFORCEMENT AGREEMENT WILL CONSTITUTE A BINDING COMMITMENT BY ALL PARTIES TO UNDERTAKE ALL NECESSARY ACTIONS TO END THE PRACTICE OF THE OCEAN DUMPING OF SEWAGE SLUDGE AT THE EARLIEST POSSIBLE OPPORTUNITY. THE GOAL OF THESE EFFORTS IS TO MEET THE DECEMBER 31, 1991 DEADLINE AND I BELIEVE THAT GOAL IS ACHIEVABLE THROUGH INTERIM SOLUTIONS FOR SOME OF THE SLUDGE CURRENTLY BEING OCEAN DUMPED. IT WILL BE ACHIEVABLE DESPITE 1) TIME CONSTRAINTS WHICH WILL SHORTEN OUR TECHNOLOGICAL SEARCH, 2) THE FINANCIAL IMPACTS OF LAND BASED ALTERNATIVES, AND 3) EXPECTED CITIZEN CONCERN. SCHEDULES SUBMITTED TO DATE BY THE OCEAN DISPOSING COMMUNITIES SHOW THAT EACH HAS BEGUN TO TAKE NECESSARY STEPS TO PROVIDE INTERIM (TEMPORARY) MEASURES, AS AUTHORIZED BY THE ACT, TO EFFECT THE CESSATION OF OCEAN DISPOSAL AS CLOSE TO THE STATUTORY DEADLINE AS POSSIBLE. EACH OF THESE SCHEDULES INVOLVES THE USE OF THE PRIVATE SECTOR TO PROVIDE OPTIONS WHILE THE COMMUNITIES ARE CONDUCTING LONGER TERM STUDIES TO DEVELOP AND IMPLEMENT MORE PERMANENT SOLUTIONS.

IN SEEKING IMMEDIATE MEANS TO CEASE OCEAN DISPOSAL, NASSAU COUNTY AND WESTCHESTER COUNTY, IN ACCORDANCE WITH STATE LAW, JOINTLY

PUBLISHED A DRAFT REQUEST FOR PROPOSALS ON MARCH 8, 1989. THIS IS THE FIRST PHASE OF A TWO STEP PROCESS WHICH WILL SOLICIT SERVICES FROM PRIVATE VENDORS FOR INTERIM ALTERNATIVE SLUDGE DISPOSAL METHODS. THIS PROCESS ALSO HAS THE POTENTIAL TO PROVIDE LONGER-TERM SOLUTIONS. AT THE PRESENT TIME, THE AVAILABILITY OF INTERIM DISPOSAL SERVICES FROM PRIVATE PROVIDERS WILL BE DETERMINED BY DECEMBER 5, 1989.

ALTHOUGH THE RESULTS OF THIS REQUEST FOR PROPOSAL PROCESS CANNOT BE KNOWN AT THIS TIME, THE GOAL REMAINS TO HAVE ALTERNATIVE DISPOSAL MEANS IN PLACE AS CLOSE TO THE STATUTORY DEADLINE AS POSSIBLE. TOWARDS THIS END, ALL NEW YORK COMMUNITIES HAVE COMMITTED TO DE-WATER THEIR SLUDGE BEFORE OR IMMEDIATELY AFTER THE DECEMBER 31, 1991 DATE. FINAL DISPOSAL OF DE-WATERED SLUDGE, TO A LARGE DEGREE, WILL DEPEND ON THE OUTCOME OF THE REQUEST FOR PROPOSALS FROM PRIVATE PARTIES. THEIR RESPONSE MAY SHOW THAT LANDFILLING, THE LEAST PREFERRED OPTION, IS THE ONLY ONE AVAILABLE.

NEW YORK CITY HAS PREPARED A SIMILAR DRAFT REQUEST FOR PROPOSALS. THE PUBLICATION OF THIS DOCUMENT IS BELIEVED TO BE IMMINENT. DUE TO THE SIZE AND COMPLEXITY OF NEW YORK CITY'S SLUDGE HANDLING NEEDS, THE MOST CURRENT PROPOSED SCHEDULE SHOWS THAT TWENTY PERCENT OF THEIR SLUDGE WILL BE TARGETED FOR INTERIM, ALTERNATIVE DISPOSAL MEANS BY THE END OF 1991. THE REMAINING FRACTION WILL BE ADDRESSED BY THE MIDDLE OF 1992. TO ACHIEVE THIS, NEW YORK CITY HAS COMPLETED PLANNING AND IS CURRENTLY DESIGNING EIGHT DE-WATERING FACILITIES AT AN ESTIMATED COST OF $289 MILLION. THE ACTUAL DISPOSITION OF THE SLUDGE OR SLUDGE PRODUCT IS, AS I NOTED, DEPENDENT

UPON THE RESULTS OF THE REQUEST FOR PROPOSAL PROCESS WHICH WILL BE CONCLUDED LATER THIS YEAR.

SCHEDULES FOR LONG TERM, PERMANENT DISPOSAL ALTERNATIVES FOR EACH COMMUNITY EXTEND INTO THE MID 1990'S, EXCEPT NEW YORK CITY WHICH EXTENDS TO 1998. EXTENSION OF LONG-TERM SCHEDULES BEYOND 1991 IS UNAVOIDABLE SINCE THE DEVELOPMENT OF PERMANENT DISPOSAL PRACTICES CAN BE CONSIDERABLY MORE COMPLEX THAN DEVELOPMENT OF THE SHORT TERM MEASURES.

THE ENFORCEMENT AGREEMENTS WHICH ARE BEING DEVELOPED MUST REFLECT THE UNCERTAINTIES OF THE "FAST TRACK" APPROACH BEING UTILIZED BY OUR COMMUNITIES IN THEIR EFFORT TO EMPLOY ALL NECESSARY MEANS TO ADDRESS THE MANDATE OF THE ACT, I.E., THE RESPONSES FROM THE PRIVATE SECTOR. I STRESS THIS, SINCE WE CANNOT LOSE SIGHT OF THE MAGNITUDE OF THE EFFORTS WHICH ARE BEING UNDERTAKEN BY THESE COMMUNITIES. I ENVISION THAT THE ENFORCEMENT AGREEMENTS AND THEIR ASSOCIATED ENFORCEMENT SCHEDULES MAY HAVE TO BE ADJUSTED AS WE LEARN MORE OF THE NATURE OF THE TASKS AHEAD SO THAT THESE INSTRUMENTS CAN REMAIN VALID AND USEFUL TOOLS IN OUR MUTUAL EFFORTS TO CEASE THE OCEAN DISPOSAL OF SLUDGE IN A PERMANENT AND ENVIRONMENTALLY SOUND MANNER. OUR RESOLVE IS TO WORK DILIGENTLY YET COOPERATIVELY WITH OUR COMMUNITIES AND THE FEDERAL GOVERNMENT TO SOLVE THIS IMMENSE PROBLEM AND, ALTHOUGH LITIGATION REMAINS A TOOL WHICH AS A LAST RESORT CAN BE USED TO ACHIEVE OUR MANDATE, I AM CONFIDENT THAT NEW YORK STATE AND ITS COMMUNITIES WILL CONTINUE ON THEIR CURRENT PATH OF ENDING OCEAN DISPOSAL ONCE AND FOR ALL.

ANY ALTERNATIVE SLUDGE DISPOSAL SYSTEM MUST COMPLY WITH OTHER STATE, FEDERAL, AND LOCAL STATUTES WHICH GOVERN. IN NEW YORK STATE, THE STATE ENVIRONMENTAL QUALITY REVIEW ACT AND THE STATE SOLID WASTE MANAGEMENT ACT WILL HAVE SIGNIFICANT IMPACTS ON THE EVOLUTION OF THE ALTERNATIVE SLUDGE DISPOSAL PROJECTS. THE STATE ENVIRONMENTAL QUALITY REVIEW ACT, SIMILAR TO THE NATIONAL ENVIRONMENTAL POLICY ACT, REQUIRES THAT REASONABLE ALTERNATIVES BE EVALUATED FOR ANY PROPOSED ACTION. IN ADDITION, THE STATE SOLID WASTE MANAGEMENT ACT ENCOURAGES LOCAL GOVERNMENTS TO ESTABLISH SOLID WASTE MANAGEMENT PLANS WHICH, AT THIS TIME, MUST BE IN PLACE AS A CONDITION OF PERMIT APPROVAL FOR SLUDGE PROJECTS.

ALSO, THE NEW YORK STATE SOLID WASTE MANAGEMENT PLAN, IN AN EFFORT TO PROMOTE INTEGRATED SOLID WASTE MANAGEMENT, ADVANCES THE CONCEPT OF THE "SOLID WASTE MANAGEMENT HIERARCHY". THE ORDER OF PREFERENCE IN THIS HIERARCHY IS: WASTE REDUCTION; RECYCLING AND REUSE; WASTE-TO-ENERGY; AND LANDFILLING.

SINCE WASTE REDUCTION IS MORE APPLICABLE TO OTHER TYPES OF SOLID WASTE MANAGEMENT, THE PREFERRED SLUDGE DISPOSAL METHODS IN NEW YORK STATE WILL EMPHASIZE REUSE AND RECYCLING OF AS MUCH SEWAGE SLUDGE AS POSSIBLE THROUGH COMPOSTING, LAND APPLICATION AND SIMILAR PROCESSES. THESE PROCESSES, AS YOU KNOW, CAN ONLY BE EMPLOYED FOR GOOD QUALITY SEWAGE SLUDGE. ALSO, THE PROPOSED FEDERAL STANDARDS FOR THE DISPOSAL OF SEWAGE SLUDGE, (40 CFR PART 503) IF PROMULGATED IN THEIR PRESENT FORM, WILL HAVE A SIGNIFICANT DETRIMENTAL IMPACT ON THE VIABILITY OF RECYCLING AND REUSE PROGRAMS.

LANDFILLING, ALTHOUGH A LESS PREFERABLE METHOD OF DISPOSAL BECAUSE OF THE LOSS OF THE ORGANIC VALUE OF THE SLUDGE, MAY BE USED AS AN INTERIM SOLUTION. DUE TO THE LANDFILL CAPACITY CRISIS WHICH WE FACE, THE LONG TERM FEASIBILITY OF THIS OPTION IS QUESTIONABLE. IN ADDITION, DISPOSAL COSTS WILL INCREASE SUBSTANTIALLY AS LANDFILLS NEAR THE SLUDGE GENERATION SITES FILL AND CLOSE AND HAULING DISTANCES INCREASE.

INCINERATION MAY ALSO BE CONSIDERED AS A DISPOSAL METHOD IF OTHER MORE DESIRABLE MEANS ARE PRECLUDED. HOWEVER, THE VIABILITY OF INCINERATION MAY NOT BE ABLE TO BE ADEQUATELY DETERMINED AT THIS TIME BECAUSE INCINERATION IS ALSO BEING PROPOSED AS A DISPOSAL METHOD FOR A VARIETY OF WASTE STREAMS. DESPITE UNCERTAINTIES ABOUT THEIR VIABILITY, INCINERATORS HAVE ALREADY BEEN PROPOSED FOR SOME NEW JERSEY COMMUNITIES. A COMPLETE BACKGROUND AIR QUALITY MONITORING SURVEY IN THE NEW YORK METROPOLITAN AREA MUST BE COMPLETED BEFORE THIS OPTION CAN BE FULLY EVALUATED. THE EPA AND NEW JERSEY SHOULD PARTICIPATE IN THIS PROCESS. IN ADDITION, COMPLEX MODELING AND HEALTH RISK ASSESSMENTS, WHICH WOULD EVALUATE THE HEALTH AND ENVIRONMENTAL IMPACTS ASSOCIATED WITH INCINERATION WOULD ALSO BE NECESSARY PREREQUISITES TO THE DEVELOPMENT OF THESE ALTERNATIVES.

CLEARLY THE PROBLEM OF FINDING ENVIRONMENTALLY SOUND, FEASIBLE ALTERNATIVES TO OCEAN DUMPING IS AN EXTREMELY DIFFICULT PROPOSITION DUE TO THE PRESENT CHARACTERISTICS OF THE SEWAGE SLUDGE, AND THE SCARCITY OF AVAILABLE LAND AND THE SITING PROBLEMS ASSOCIATED WITH LAND-BASED SLUDGE DISPOSAL. IT IS NEW YORK STATE'S GOAL TO ELIMINATE

OCEAN DISPOSAL OF SEWAGE SLUDGE IN AN ENVIRONMENTALLY SOUND MANNER BY THOROUGHLY EXAMINING THE IMPACTS OF ALL VIABLE OPTIONS.

AS FOR CONTINUATION OF DUMPING AFTER AUGUST 14, HEARINGS ON THE PROPOSED OCEAN DUMPING PERMITS WERE HELD BY EPA THE WEEK OF APRIL 24, 1989. WE UNDERSTAND THAT CONSIDERABLE OPPOSITION TO THE PERMITS WAS EXPRESSED BY THE DUMPERS WHO BELIEVE THAT, UNLESS THE PERMIT PROCEDURES ARE REVISED, THE DUMPERS CANNOT MEET THE PERMIT CONDITIONS. THIS, AS WELL AS THE CONTINUING NEGOTIATIONS ON THE ENFORCEMENT AGREEMENTS, WOULD SEEM TO MAKE IT VERY DIFFICULT TO MEET THE AUGUST 14, 1989 DEADLINE FOR PERMIT ISSUANCE.

I CAN ALSO REPORT TO YOU THAT GOVERNOR CUOMO HAS INTRODUCED LEGISLATION IN THE NEW YORK STATE LEGISLATURE WHICH WILL ESTABLISH THE STATE CLEAN OCEANS FUND PURSUANT TO SECTION 104(C)(5) OF THE ACT. FUNDS PROVIDED BY THIS FUND WILL BE USED BY DUMPERS TO DEVELOP AND IMPLEMENT ALTERNATIVE SYSTEMS AND INTERIM MEASURES FOR SEWAGE AND INDUSTRIAL SLUDGE MANAGEMENT, IMPROVEMENTS IN PRETREATMENT, AND TREATMENT AND STORAGE TECHNIQUES FOR SEWAGE SLUDGE.

THE FIRST ANNUAL STATE PROGRESS REPORT WHICH THE ACT REQUIRES IS DUE ON SEPTEMBER 30, 1989. I EXPECT THAT AT THAT TIME, NEW YORK STATE WILL BE IN A POSITION TO REPORT THAT CONSIDERABLE PROGRESS HAS BEEN MADE IN MEETING THE GOALS OF THE OCEAN DUMPING BAN ACT.

STATEMENT OF

DONALD A. DEIESO
ASSISTANT COMMISSIONER
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

BEFORE

SUBCOMMITTEE ON OCEANOGRAPHY AND THE GREAT LAKES

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATION

SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION
AND THE ENVIRONMENT

MAY 16, 1989

Good afternoon ladies and gentlemen. I am Donald A. Deieso, Assistant Commissioner of the New Jersey Department of Environmental Protection. I am here today to give you a status of the Department's activities to implement the Ocean Dumping Ban Act of 1988 and the New Jersey Ocean Sludge Dumping Elimination Act.

The Department has been actively involved in this ocean initiative in full coordination with the US Environmental Protection Agency. The package describes in detail the Department's activities to date as well as the efforts which will be needed in the future to effect full implementation of the federal law.

First, let me make clear the distinction between activities of the US Environmental Protection Agency and the New Jersey Department of Environmental Protection. The New Jersey Legislature, in July of last year passed a bill prohibiting the ocean disposal of sewage sludge by any New Jersey sewerage treatment facility or authority after March 17, 1991. As a companion to this bill, a second piece of state legislation was enacted which among other things, required all ocean dumpers to submit land-based sludge management plans to the Department by April 30, 1989.

This second bill supported permit actions the Department had already imposed on the 6 New Jersey ocean dumpers six months prior to the state legislation. In March, 1988, the Department issued final modifications of the NJPDES permits of each of the six ocean dumpers. These modifications required the ocean dumpers to develop and submit to the Department land-based sludge management plans by April 30, 1989. A copy of that NJPDES Permit modification is attached for your reference (Attachment #2).

While several distinctions between the federal and state statutes exist, basically, the Environmental Protection Agency focuses federal activity on the ocean dumping permits, state activity is focused on the implementation of land-based alternatives. Therefore the Department has devoted its efforts to assuring that there is a regulatory structure to enforce the implementation of necessary land-based alternatives, and to assuring that all necessary technical assistance is provided to the ocean dumpers. To that end, when the Department modified the ocean dumpers NJPDES Permits, we created the Ocean Dumpers' Task Force. The Task Force was composed of representatives of each of the 6 ocean dumpers, their consultants and legal counsel, representatives from the Department programs which are responsible for issuing permits for the land-based sludge management alternatives and legal counsel from the Department's Division of Regulatory Affairs and from the State Attorney General's Office. The Department has also asked that EPA send representatives to these meetings to assure that close coordination is maintained on this initiative.

I would like to review with you today the Department's major accomplishments in implementing the mandate to end ocean disposal:

First, the Department has evaluated the requirements of the Clean Oceans Fund and has determined that we already have in place the necessary mechanisms to institute this account. We are currently developing the appropriate administrative procedures to assure that monies are properly deposited and will only be disbursed in accordance with the criteria of the Marine Protection Research and Sanctuaries Act Amendments.

Second, we have taken the necessary steps to provide for the required 10% set-aside of State Revolving Fund monies for New Jersey's ocean dumpers. All six of these facilities are appropriately included in our priority list for loan monies if they choose to make application for these funds.

Third, the Department modified the 6 ocean dumpers' NJPDES Permits in March, 1988, to require submission of a land-based sludge management plan, and you have seen the language of that modification in Attachment #2.

Fourth, we have successfully secured compliance with that NJPDES Permit modification, and all six of the ocean dumpers have submitted their plans in accordance with that permit requirement. Attachment #3 of your package provides copies of the implementation schedules which each of the ocean dumpers has submitted as a required component of their land-based sludge management plans. The Department is in the process of reviewing the six plans. An administrative completeness review was completed last week, and letters informing the ocean dumpers of the acceptability of their plans will be sent this week. The Department must report to the State Legislature by the end of June of this year regarding the status of these plans.

Fifth, the Department is preparing a second round of modifications to the NJPDES Permits of the six New Jersey ocean dumpers. The Department intends to include the implementation schedules for both long term and interim land-based sludge management alternatives as contained in the plans submitted by the six ocean dumpers. This step will provide the Department with the necessary mechanism to enforce against the ocean dumpers for any slippage in meeting these schedules. The ocean dumpers will be exposed to penalties up to $50,000 per day per violation. Obviously, the implementation schedules must be consistent with those contained in the Agreements negotiated among the USEPA, the Department and each of the six ocean dumpers.

We believe it is important to note that all these accomplishments have been achieved through the mechanism of assuring compliance with NJPDES Permits. We believe the enforcement penalties of $50,000 per day provide us with the necessary power to assure that the mandate to end ocean disposal can be met.

Looking at our future activities, in addition to this second round of NJPDES Permit modifications, the Department will be involved in issuance of many other permits necessary to assure compliance with the ocean dumping deadline. Specifically, we must issue permits for both the interim and long term land-based projects selected by the ocean dumpers. Attachment #4 of the package details the necessary permits and the permitting process for each of these permits. When you review this attachment please notice that each of these permits provides for public comment.

I would now like to spend a little time discussing the subject of alternative selection. There has been considerable public concern recently over the alternatives that New Jersey's six ocean dumpers have selected and whether there might be more suitable alternatives to those included in their April 30th plans. So I would like to take a moment here to discuss the sludge management alternative selection process. In November, 1987, the Department adopted the Statewide Sludge Management Plan. Part 4 of that Plan provides a comprehensive overview of the alternatives available for managing sewage sludge in New Jersey. Attachment #5 of your package is a copy of a chart from our Statewide Plan depicting the process for selecting an alternative given the quality and pathogen characteristics of a particular sludge. There are, however, many other factors which must, also be considered when selecting a sludge management alternative. These include but are not limited to the availability of a site, the quantity of sludge which must be moved from the treatment plant to the sludge management site, and the political jurisdiction of the sludge management site. New Jersey's ocean dumpers had to address these factors and many others when making their selections.

Many restrictions were faced by the ocean dumpers in developing their plans. The existing quality of their sludge makes it unsuitable for land application programs without imposing more stringent pretreatment controls on the industrial base within their service areas. All six of the ocean dumpers have approved pretreatment programs in place, but new, more stringent limits on the industrial contaminants discharged into the municipal sewer systems would have to be developed to meet the land application criteria. Development of these pretreatment limits is a lengthy process which can take as long as a year. And following the development of the pretreatment limits, necessary local regulations must be instituted, industrial permits must be modified and then the industries must implement the necessary modifications to their pretreatment operations. All this takes time.

The location of the treatment plants imposes another restriction on alternative selection. The industrialized northeast section of the State limits the land available for commitment to sludge management alternatives. This fact, together with the enormous costs associated with daily transport of large volumes of sludge (approximately 500 dry tons or 2500 tons at 20% solids) drove the ocean dumper's alternative selection toward projects which could be sited on treatment plant grounds on limited acreage.

Previous planning was, also, a consideration in New Jersey's ocean dumpers' analyses. Each of these treatment plants had developed a land-based sludge management plan under the Federal Wastewater Facilities Grant Program of Section 201 of the Clean Water Act. The 201 Planning Process included a detailed alternative analysis, site evaluation, cost effectiveness evaluation and public participation component. Each of these 201 Plans selected some form of incineration for land-based sludge management.

It must, also, be remembered that these sewerage agencies are public bodies, working with public monies. Although, there are many exotic alternatives for sludge management, public bodies are reluctant to invest millions of dollars of the public's monies on an unproven technology no matter how promising that technology might appear on paper, in bench scale studies or in pilot studies. So alternative selection has been driven toward more conventional technologies which have an established track record.

But by far the most powerful driving force in New Jersey's ocean dumpers' alternative selection has been the pressure of time imposed by the schedules in the State and Federal Legislation. The 34 months (July, 1988 to March, 1991) allowed for implementation under New Jersey's Statute and the 38 months (November, 1988 to December, 1991) allowed for implementation under the Federal Statute do not provide the luxury of protracted alternative analysis. Accordingly, New Jersey's ocean dumpers have, with the exception of Middlesex County Utilities Authority, utilized the existing alternative analysis in their 201 Plans and confined themselves to more detailed analysis of the thermal reduction and emission control technologies available today. Attachment #6 of your packages identifies the selected interim and long term alternatives of each of New Jersey's ocean dumpers.

The Department has not been involved in the alternative selection process. New Jersey's statutes place the onus of alternative selection on the local level. The Department has taken the position that we are able to issue a permit to any selected alternative provided it meets the requirements under environmental and public health regulations.

In summary, utilizing the tool of NJPDES Permit conditions, the New Jersey's Department of Environmental Protection believes it has created a regulatory and technical support structure which is capable of assuring that the statutory mandates are met to implement land-based sludge management. There is only one obstacle which may prevent realization of this goal and that is public opposition to the land-based alternatives. Attachment #7 of the package provides a sampling of the kind of public opposition we have experienced to the selected land-based alternatives. We can be assured that siting opponents will be just as vigorous as opponents to ocean disposal regardless of the alternative or site selected. We must anticipate increased opposition in the form of litigation and pressure on elected officials at all levels. Accordingly, the Department is offering to work with you and with New Jersey's Legislators on a public information and participation program which will respond to public concerns.

FEDERAL OCEAN DUMPING BAN ACT	NEW JERSEY'S REQUIREMENTS
• Deadline of December 31, 1991	• Deadline of March 17, 1991 (L.1988 c.57)
• No new dumpers of sewage sludge or industrial waste after effective date of Act	• No dumpers of sewage sludge after March 17, 1991 • All sludge meets landbased quality criteria by March 17, 1991
• No dumping after August 1989 without a Permit and Compliance/Enforcement Agreement	
• Signed Compliance/Enforcement Agreement by May 1989 to include*:	• Land-based Sludge Management Plan by April 30, 1989 (L.1988 c.56) to include: 1. Inventory and Strategy Document 2. Alternatives Document
1. Any necessary activities to implement interim measures	3. Selection Document for Interim Alternative including analysis of contingency management and any necessary pretreatment program revisions 4. Implementation Document for Interim Alternative including the following: a) financial management plan for Interim Alternative b) completed permit applications for Interim Alternative c) copies of contract discussions with primary and contingency Interim Alternatives if an existing sludge management alternative is to be used d) implementation schedule for Interim Alternative indicating dates for accomplishment of the following: 1) bid advertised for construction 2) bid awarded for construction 3) start of construction 4) completion of construction/ startup-shakedown procedures 5) submission of executed contracts for primary and contingency management if an existing sludge management alternative is to be used for interim management 6) all sludge out of the ocean
	5. Selection Document for Long Term Alternative including analysis of contingency management and pretreatment program revisions and site selection
2. Preparation of designs and specifications 3. Site acquisition	6. Implementation Document for Long Term Alternative including the following a) financial management plan for Long Term Alternative b) Stage 1 Treatment Works Approval for all treatment works associated with the Long Term Alternative c) ash management plan if thermal reduction is selected Long Term Alternative d) implementation schedule for Long Term Alternative indicating dates for accomplishment of the following:
4. Compliance with federal, State and local laws and regulations	1) submission of completed applications for all permits required for implementation of Long Term Alternative 2) bid advertised for design of Long Term Alternative 3) bid awarded for design of Long Term Alternative 4) bid advertised for construction of Long Term Alternative
5. Equipment acquisition	5) bid awarded for construction of Long Term Alternative
6. Construction and testing	6) submission of copies of executed contracts if an existing sludge management alternative is to be used for Long Term management 7) start of construction
7. Operation at full capacity 8. Completion of facility and stopping ocean dumping	8) completion of construction/startup-shakedown 9) all sludge out of the ocean

* Listed components of the Compliance/Enforcement Agreements are based on EPA Region II handouts at December 13, 1988 meeting.

Attachment 2

Permit No.
Modification issued 5/25/88

4. Residuals Management Requirements

D. The Permittee shall comply with the following schedule which shall assure that a landbased sludge management alternative and a site for said alternative has been selected.

(1) The Permittee shall designate an authorized representative who shall be the contact on landbased sludge management and submit such authorization in writing to the Department on or before April 30, 1988.

(2) The Permittee shall, by formal resolution, appropriate an adequate amount of money for the purpose of landbased sludge management planning. Said appropriation shall provide for preparation of the Inventory and Strategy Document, the Alternatives Document, the Selection Document, the Implementation Document, the Permittee's Sludge Management Plan Submission Package, the holding of a public hearing, the preparation of a transcript of the hearing and the preparation of a responsiveness summary addressing all significant public comments on the Permittee's Sludge Management Plan, pursuant to Part 6 and Appendix K of the Statewide Sludge Management Plan. Documentation of said appropriation shall be submitted to the Department on or before June 30, 1988.

(3) The Permittee shall submit a complete Sludge Management Plan Submission Package including the following:

(a) an Inventory and Strategy Document in which the generator shall identify sludge management needs and outline the strategy for long term and contingency landbased sludge management;

(b) an Alternatives Document in which the generator shall examine state of the art landbased sludge management methods and sites from which the ultimate landbased sludge management selection will come;

(c) a Selection Document in which the generator shall document that arrangements made for state of the art landbased sludge management are sufficient for management of the long term sludge production projection, and that the quality of the generator's sludge is acceptable for the selected alternative;

(d) an Implementation Document in which the generator shall identify the shortest feasible schedule for implementation of landbased sludge management including a financial management statement and a designation of the responsible constructing and operating entities; and

(e) a copy of the formal notice of public hearing held on the generator's sludge management plan, a copy of the transcript of the public hearing and a responsiveness summary addressing all significant issues raised during the hearing and public comment period.

The complete Sludge Management Plan Submission Package shall be submitted to the Department on or before April 30, 1989.

(4) All documents required in items (1) through (3) shall be submitted to:

Bureau of Pretreatment and Residuals Management
Division of Water Resources
CN-029
Trenton, NJ 06825

Attachment 3

IMPLEMENTATION SCHEDULES

FOR

EACH OF THE OCEAN DUMPERS

Generator: BCUA

Form I-2

IMPLEMENTATION SCHEDULE*

Selected Alternative Reference ID Code: Long-Term

Facility Name: BCUA-WWTP

Date

1. Issue RFQ for Design:/Construction 12/1/89

2. Issue RFP for Design:/Construction 2/1/90

3. Select Design/Constructor ~~Notice Award for Design~~ 9/1/91

4. Design Complete: N/A

5. RFQ for Construction (if privatized): N/A

6. RFP for Construction (if privatized): N/A

7. Bid Notice for Construction: (if privatized) N/A

8. Notice Award for Construction: (if privatized) N/A

9. Initiation of Construction: 2/1/93

10. Completion of Construction: 2/1/95

11. RFQ for Operation (if privatized): N/A

12. RFP for Operation (if privatized): N/A

13. Notice of Award for Operation: (if privatized) N/A

14. Start of Operations: 8/1/95

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*This schedule is subject to revision with judicial consent. If a TRF is not implemented due to the securing of long-term markets for chemical stabilization product, it will require revision.

THE ATTACHED SECTIONS ARE INSERTED AFTER THE END OF THE FIRST PARAGRAPH ON PAGE 4 OF THE PROPOSED AGREEMENT. THESE REVISED SECTIONS REPLACE THE TEXT OF SECTIONS V.A., V.B., AND V.C. BCUA AND PS&S WILL BE AVAILABLE FOR A MEETING, IF NECESSARY, FOR DISCUSSION OF THE REVISIONS. PLEASE ADVISE MR. JEROME SHEEHAN OF BCUA REGARDING A MEETING.

V.A. The BCUA shall implement the following plan for an alternative system for the management and disposal of sewage sludge transported or dumped by the BCUA: operation of an individual thermal reduction facility ash handling system, and ash vitrification facility, as described in the BCUA April 30, 1989 submittal to NJDEP.

V.B. In implementing its plan for an alternative system of sewage sludge management and disposal, BCUA shall comply with the following schedule:

(Item #1 has been deleted since it does not apply to BCUA.)

2. Completion and submission of Sludge Management Plan with a selected alternative system (or alternative systems if more than one method of sludge management will be used as part of the plan) by April 30, 1989.

3. Establishment of local pretreatment limits (if applicable) by August 1, 1991.

4. Submit Sludge Management Plan for approval by State of New Jersey by April 30, 1989. NJDEP will review this plan and will render a final determination by June 30, 1989.

5. Issue Request for Qualifications (RFQ) to Design/Construct Contractors and prepare list of qualified contractors by December 1, 1989.

6. Issue Request for Proposals (RFP) to qualified Design/Construct Contractors by February 1, 1990.

7. Select and award contract to Design/Construct Contractor by September 1, 1991.

8. Initiate preliminary engineering necessary to submission of permit applications by September 15, 1991.

9. Submit complete application to NJDEP for Air Pollution Control Permit by March 1, 1992.

10. NJDEP will review the application for and advise the BCUA as to completeness by April 1, 1992, and will render a final decision on the application by September 1, 1992.

11. Submit applications to the HMDC for site plan approval by November 1, 1991.

12. Acquire sites, if necessary, for the alternative system or systems selected by July 1, 1992.

13. Submit application to NJ Dept. of Community Affairs for foundation permit by September 1, 1992.

14. Commence construction of facilities for the alternative system or systems selected by February 1, 1993.

15. Complete construction of facilities and installation of equipment for the alternative system or systems selected by February 1, 1995.

16. Commence testing of the alternative system or systems, by January 1, 1995.

17. Complete testing of alternative system or systems, and commence full operation of said system or systems by August 1, 1995.

V.C. The BCUA shall implement the following interim measures to ensure that its ocean dumping operations are terminated by March 17, 1991:

1. Complete final design of sludge dewatering equipment and facilities by September 1, 1989.

2. Submit treatment works approval application and HMDC site plan application by September 1, 1989.

3. Advertise for bids on sludge dewatering equipment and facilities by October 1, 1989.

3A. Receive determination for treatment works approval from NJDEP by November 1, 1989.

4. Award contracts for sludge dewatering equipment and facilities by December 1, 1989.

5. Commence on-site construction of sludge dewatering equipment and facilities by December 31, 1989.

6. Secure contracts for interim management of sewage sludge for period of time from March 17, 1991 to date upon which alternative system or systems referred in subparagraph IV.A above become operational by October 31, 1990.

7. Secure contracts for a contingent, alternative interim disposal method for use if the first interim disposal method becomes unavailable, by October 31, 1990.

8. By March 17, 1991:
Complete all construction activities for operation and shakedown of sludge dewatering facilities. Initiate full operations of sludge dewatering facilities and interim management plan. Cease ocean disposal.

Joint Meeting of Essex and Union Counties

Generator: SEE ATTACHMENT

Form I-2

IMPLEMENTATION SCHEDULE

Selected Alternative Reference ID Code: ______________

Facility Name: ______________________________

Date

1. RFQ for Design: ____________________

2. RFP for Design: ____________________

3. Notice Award for Design: ____________________

4. Design Complete: ____________________

5. RFQ for Construction (if privatized): ____________________

6. RFP for Construction (if privatized): ____________________

7. Bid Notice for Construction: (if privatized) ____________________

8. Notice Award for Construction: (if privatized) ____________________

9. Initiation of Construction: ____________________

10. Completion of Construction: ____________________

11. RFQ for Operation (if privatized): ____________________

12. RFP for Operation (if privatized): ____________________

13. Notice of Award for Operation: (if privatized) ____________________

14. Start of Operations: ____________________

construction of the same; and development and initiation of the ash management plan.

Sludge Management Plan Activities

The remaining activities to be completed in the planning phase of this project are as follows:

- March 2, 1989 - Draft Land-Based Sludge Management Plan (SMP) submitted to the Joint Meeting
- April 6, 1989 - Public Hearing on the Draft SMP
- April 24-28, 1989 - Public Hearings on the EPA/NJDEP/Joint Meeting Consent Decree and Enforcement Agreement
- April 30, 1989 - Submittal of the SMP to NJDEP
- May 30, 1989 - EPA, DOJ, NJDEP, and the Joint Meeting sign the Consent Decree and Enforcement Agreement
- August 14, 1989 - EPA issues new interim MPRSA permits for ocean disposal of sludge at the 106-mile DMSDS

Sludge Dewatering Building

The design activities for the Sludge Dewatering Building were initiated on January 3, 1989 and include preliminary designs of both the Sludge Dewatering Building and the Sludge Incineration Building, preparation and submittal of a Basis-of-Design Report, and the preparation of final design plans, specifications, and bid documents. The remaining activities to be completed in the design phase are:

- April 28, 1989 - Completion and submittal of the Basis-of-Design Report.
- October 5, 1989 - Completion and submittal of the final design plans, specifications, and bid documents; completion and submittal of permit applications for a

NJDEP Stage 2 Treatment Works Approval and construction permits from the City of Elizabeth.

- November 6, 1989 - Advertise for bids for Sludge Dewatering Building equipment and construction.
- November 19, 1989 - Receive Stage 2 Treatment Works Approval from NJDEP and all construction permits from the City of Elizabeth.
- December 7, 1989 - Receive bids for Sludge Dewatering Building
- December 21, 1989 - Award construction contracts for Sludge Dewatering Building

The construction schedule for the SDB is as follows:

- February 1, 1990 - Commence on-site construction activities.
- December, 1990 - Prepare O&M manual for SDB.
- February, 1991 - Initiate systems training program.
- March 17, 1991 - Complete all construction related activities necessary for operation, including shakedown; and initiate operation of the Sludge Dewatering Building.

Interim Disposal Activities

The selected interim disposal sites (Grand Central Sanitary Landfill, Pen Argyle, Pennsylvania and Community Refuse, Ltd., Greencastle, Pennsylvania) must be under contract to receive dewatered sludge from the Joint Meeting on Monday, March 18, 1991. While it appears that there may be adequate time (two years) to establish a contractual arrangement with these operational facilities, it would be prudent to negotiate these contracts expeditiously.

The initial activities needed to implement these alternatives are to obtain approval of the Pennsylvania

Department of Environmental Resources (PADER) through the Form 43/Module 1 permit major modification application process. Currently, one Form 43 has been approved and another Form 43 approval is forthcoming.

The implementation schedule for the Interim Disposal Activities is as follows:

- January 27, 1989 - Submitted Form 43/Module 1 for Grand Central Sanitary Landfill to PADER.
- February 21, 1989 - Submitted Form 43/Module 1 for Community Refuse, Ltd. to PADER
- February 24, 1989 - Received PADER approval for Grand Central Sanitary Landfill Form 43/Module 1
- April, 1989 - Receive PADER approval for Community Refuse, Ltd. Form 43/Module 1
- October 31 to December 31, 1990 - Complete contract negotiations and execute contracts with both landfills.
- January, 1991 - Submit updated Form 43/Module 1 applications to PADER for GCS and CRL
- March 18, 1991 - Initiate interim disposal activities.

Sludge Incineration Building

Much work remains to be done in the planning, permitting, and design phases of the SIB implementation plan before the construction can begin. Key milestones in the SIB implementation plan include the following:

- April 1, 1989 - Submitted air quality modeling protocol to NJDEP.
- April 3, 1989 - Received waiver of Stage 1 Treatment Works Approval.
- May 1, 1989 - Receive approval of air quality modeling protocol.

- May 1, 1989 - Submit air permit application (without modeling) to NJDEP
- May 5, 1989 - Complete preliminary design of the SIB.
- June 1, 1989 - Receive approval of emissions and control technology demonstration in permit application.
- July 31, 1989 - Submit modeling portion of application for Air Emissions Permit to NJDEP.
- July 31, 1990 - Receive Air Emissions Permit.
- June 30, 1991 - Solicit proposals for preparation of final engineering designs and related specifications for the SIB.
- August 30, 1991 - Award contract for preparation of final design plans and specifications.
- May 30, 1993 - Complete preparation of final design plans and specifications; submit completed permit applications for NJDEP Stage 2 Treatment Works Approval and construction permits from the City of Elizabeth.
- August 30, 1993 - Receive Stage 2 Treatment Works Approval from NJDEP and all construction permits from the City of Elizabeth.
- December 10, 1993 - Advertise for bids for procurement of equipment and construction of the SIB.
- March 10, 1994 - Receive bids for the Sludge Incineration Building equipment and construction.
- May 10, 1994 - Award construction and equipment procurement contracts for the SIB.
- September 10, 1994 - Commence on-site construction activities.
- August 30, 1997 - Commence testing of the SIB.
- April 30, 1998 - Complete testing of the SIB and commence full operation.
- July 10, 1998 - Complete all construction-related activities at the SIB.

- July 10, 1998 - Complete all construction-related activities at the SIB.

Ash Management

Formulation of an ash management implementation plan for the Joint Meeting SMF is dependent upon the ability of the Union County Utilities Authority (UCUA) to develop and implement their ash landfill(s) for the proposed Union County Energy Recovery Facility.

In the event UCUA is not able to implement these facilities, or if the implemented facility does not have the capacity to accept ash from the Joint Meeting's SMF, the Joint Meeting will enter into a contractual arrangement with one of the landfills used during the Interim Disposal Period, or some other permitted landfill, for ash disposal.

Ash recovery, in some form, may become a viable alternative to landfill disposal of incinerator ash. At the present time, however, ash recovery systems are still in the research and development phase, and thus cannot be considered within the framework of this Sludge Management Plan.

Generator: LINDEN ROSELLE SEWERAGE AUTHORITY

Form I-2

IMPLEMENTATION SCHEDULE

Selected Alternative Reference ID Code: V-B-1

Facility Name: Linden Roselle Sewerage Authority

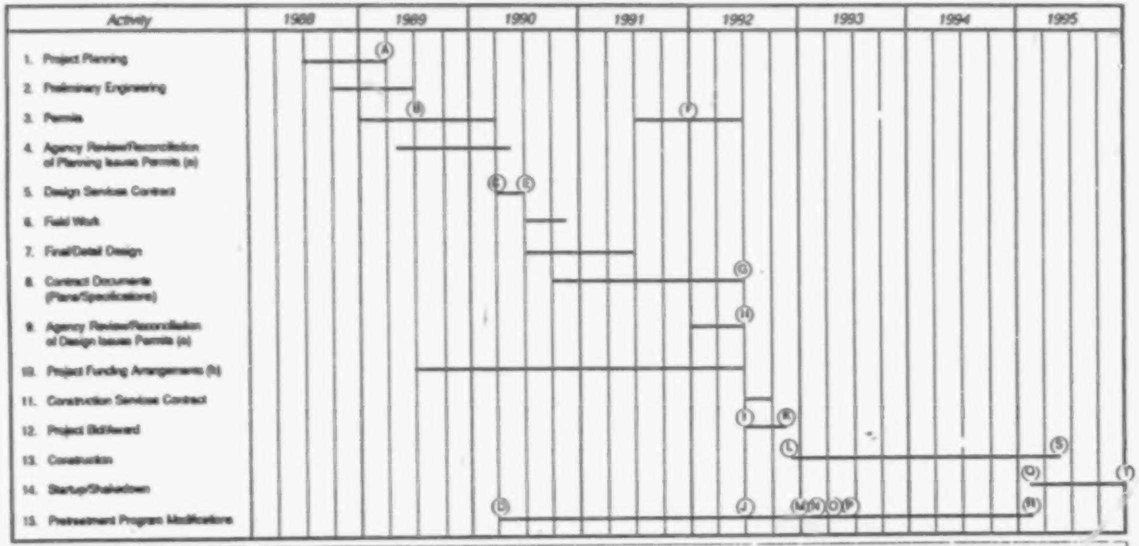
Date

1. RFQ for Design: 4/01/90
2. RFP for Design: 4/01/90
3. Notice Award for Design: 7/01/90
4. Design Complete: 1/01/92
5. RFQ for Construction (if privatized): ______
6. RFP for Construction (if privatized): ______
7. Bid Notice for Construction: (if privatized) ______
8. Notice Award for Construction: (if privatized) ______
9. Initiation of Construction: 12/01/92
10. Completion of Construction: 4/15/95
11. RFQ for Operation (if privatized): ______
12. RFP for Operation (if privatized): ______
13. Notice of Award for Operation: (if privatized) ______
14. Start of Operations: 1/01/96

Figure 2-1

Project Implementation Schedule
Long Term Land Based Sludge Management Program
Linden Roselle Sewerage Authority

April 1989



Notes:

(a) Agency review/reconciliation periods have been assumed consistent with project complexity and/or applicable regulations.

(b) Project funding arrangements are variable depending upon funding source selected.

CDM

environmental engineers, scientists,
& management consultants

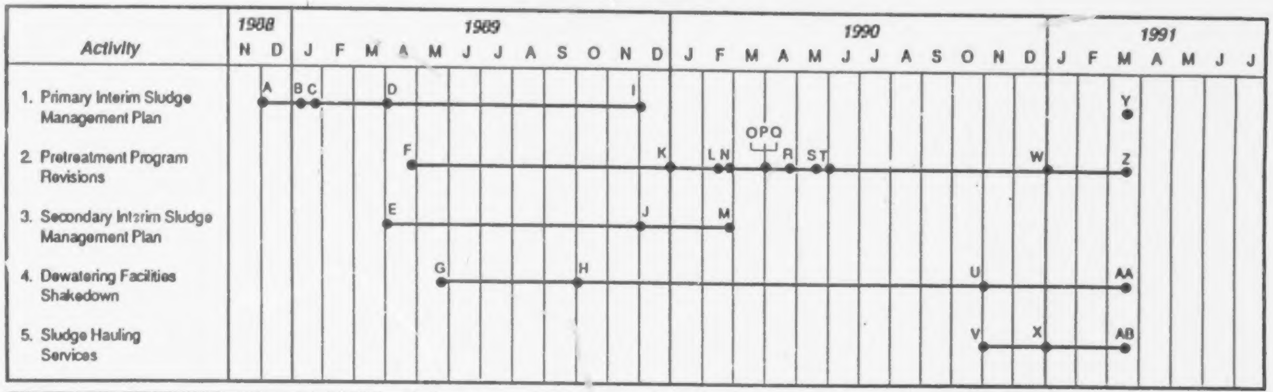
Milestone Identification	Description	Milestone
A	SMP/TWA1 Submission	04/30/89
B	Air Pollution Control Permit (APCP) Application Submission	07/01/89
C	Initiate Negotiation Engineering Design Contract	04/01/90
D	Prelim. Determination Need to Mod. Pretreat. Program	04/01/90
E	Award Engineering Design Contract	07/01/90
G	Project Permit Application Submission Requirement Completed	01/01/92
F	Final Engineering Design and Contract Document Completion	07/01/92
H	All Project Permits Secured	07/01/92
I	Advertise Construction Contract	07/01/92
J	Final Determination Need to Modify Pretreat. Program	07/01/92

Milestone Identification	Description	Milestone
K	Award Construction Contract	11/15/92
L	Initiate Construction	12/01/92
M	Complete Development of Revised Pretreat. Limits	01/01/93
N	Receive NJDEP Approval of Revi. Pretreat. Limits	03/01/93
O	Complete Pretreat. Limit Regulatory Revisions	05/01/93
P	Modify Indust. User Permits Incorporating Revised Limits	07/01/93
Q	Initiate Startup/Shakedown Activities	02/15/95
R	Assure Indust. User Compliance with Revised Limits	02/15/95
S	Complete Construction	04/15/95
T	Complete Startup/Shakedown Activities Commence Full Operation	01/01/96

03/13/89

Project Implementation Schedule
Interim Land Based Sludge Management Program
Linden Roselle Sewerage Authority

April, 1989



Milestone Identification	Description	Milestone
A	Commence Primary Interim Sludge Disposal Discussions with SBRSA	12/01/88
B	SBRSA Notice of Intent to LRSA	01/10/89
C	LRSA Notice of Intent to SBRSA	01/24/89
D	Initiate Interim Sludge Disposal Negotiations with SBRSA	04/01/89
E	Initiate Development of Bid Specifications for Out-of-State Sludge Landfilling Contract - Secondary Interim Sludge Disposal	04/01/89
F	Award Engineering Contract - Interim Sludge Disposal Pretreatment Limits Development	04/26/89
G	Award Engineering Contract - Dewatering Facilities Shakedown, Commence Limited Preliminary Assessment	05/24/89
H	Conclude Preliminary Dewatering Facilities Assessment. If necessary, Commence Recommended Modification/Replacement.	10/01/89
I	Execute Primary Interim Sludge Disposal Contract with SBRSA	11/30/89
J	Advertise Bids for Secondary Interim Sludge Disposal Contract	12/07/89
K	Submit New Pretreatment Limits to NJDEP	12/31/89
L	Receive NJDEP Approval - New Pretreatment Limits	02/15/90
M	Award Contract - Secondary Interim Sludge Disposal	02/28/90
N	Publish Proposed New Pretreatment Limits for Public Comment	03/01/90
O	LRSA Adoption of New Pretreatment Limits	03/28/90

Milestone Identification	Description	Milestone
P	Notify All Industrial Users of New Pretreatment Limits	03/29/90
Q	Initiate Drafting of Permit Modifications and Publish Notices of Proposal to Issue Modified Permits	03/30/90
R	Conclude Permit Modification Activities	04/26/90
S	LRSA Adoption of Modified Permits	05/23/90
T	Notify NJDEP of Permit Modification Completion. Initiate Compliance Assurance Activities	05/31/90
U	If necessary, Conclude Dewatering Facilities Modifications/Replacement. Initiate Final Dewatering Facilities Shakedown.	10/31/90
V	Advertise Bid for Sludge Hauling Services	10/31/90
W	Ascertain Industrial User Compliance with New Pretreatment Limits and Attainment of Desired Sludge Quality. As Necessary, Institute Corrective Measures.	12/31/90
X	Award Contract for Sludge Hauling Services	12/31/90
Y	Initiate Primary Interim Sludge Disposal at SBRSA	03/17/91
Z	Final Assessment - Industrial User Compliance and LRSA Sludge Quality	03/17/91
AA	Conclude Dewatering Facilities Shakedown, Commence Full Service	03/17/91
AB	Commence Hauling to SBRSA	03/17/91

03/06/89

District: MCUA Form I-2

DISTRICT IMPLEMENTATION SCHEDULE

Selected Alternative Reference ID Code: V1-3-B

Facility Name: MCUA

Date

1. RFQ for Design: N/A

2. RFP for Design: N/A

3. Notice Award for Design: N/A

4. Design Complete: Nov. 30, 1989*
 Nov. 30, 1989 **

5. RFQ for Construction (if privatized): N/A

6. RFP for Construction (if privatized): N/A

7. Bid Notice for Construction: (if privatized) N/A

8. Notice Award for Construction: (if privatized) N/A

9. Initiation of Construction: March 31, 1990*
 January 31, 1990**

10. Completion of Construction: February 1, 1991*
 January 1, 1991**

11. RFQ for Operation (if privatized): N/A

12. RFP for Operation (if privatized): N/A

13. Notice of Award for Operation: (if privatized) N/A

14. Start of Operations: March 17, 1991*
 March 17, 1991**

* Schedule for dewatering facility.
** Schedule for chemical fixation.

EPA - MCUA
CONSENT DECREE

V.A. The MCUA shall implement the following plan for an alternate system for the management and disposal of sewage sludge transported or dumped by the MCUA:

V.B. In implementing its plan for an alternative system of sewage sludge management and disposal, MCUA shall comply with the following schedule:

1. Commencement of detailed facility planning to identify the alternative system or systems to be used to ensure permanent phase out and termination of its ocean dumping of sewage sludge by Complete.
2. Completion of detailed sludge management plan and submittal of completed plan for selected alternative system for alternative systems if more than one method of sludge management will be used as part of the plan, by April 30, 1989.
3. Establishment of local pretreatment limits by January 1, 1990 (if necessary).

V.C. The MCUA shall implement the following measures to ensure that its ocean dumping operations are terminated by March 17, 1991:

DEWATERING FACILITIES

1. Complete final design of sludge dewatering facilities by November 30, 1989.
2. Submit complete applications for Stage 2 treatment works approval by, April 30, 1989.
3. NJDEP determine administrative completeness of application by May 15, 1989.
   20
4. NJDEP act upon Stage 2 treatment works approval permits for the alternative system or systems selected by June 15, 1989.
5. Submit applications for dewatering building permits to the Department of Community Affairs, Division of Building and Construction ~~between July 1, 1989 and~~ by November 1, 1989.

6. DBC will act upon application within two weeks of each submittal.

7. Advertise for all bids for construction sludge dewatering facilities by December 1, 1989.

8. Award contract for sludge dewatering facilities construction by January 31, 1990.

9. Commence on-site construction by March 31, 1990.

10. Complete construction of sludge dewatering facilities by February 1, 1991 and commence shake down period.

11. Initiate full operations of sludge dewatering facility and cease ocean dumping by March 17, 1991.

CHEMICAL STABILIZATION FACILITIES

1. Submit complete plan amendment for use of chemically fixed sludge for daily and intermediate cover at Edgeboro Landfill by, April 30, 1989.

2. NJDEP determine administrative completeness of application~~s~~ by May ~~15~~ 30, 1989.

3. NJDEP to act upon plan amendment for use of chemically fixed sludge at Edgeboro Landfill by ~~June 15~~, 1989.

4. Complete documents for procurement of chemical fixation facilities by October 1, 1989.

5. NJDEP to act upon permanent registration for Edgeboro Landfill by September 30, 1989.

6. Advertise for bids for construction chemical fixation facilities by November 30, 1989.

7. Award contract for chemical fixation facilities by January 31, 1990.

8. Submit application for Stage 2 treatment works approval for chemical fixation facilities by May 1, 1990.

9. Submit application for building permit to New Jersey Division Building and Construction (NJDBC) by May 30, 1990.

10. DBC will act upon permit application by June 15, 1990.

11. NJDEP act upon Stage 2 treatment works approval for chemical fixation facilities by June 15, 1990.

12. MCUA to secure contracts for or acquire Edgeboro Landfill by July 1, 1990.

13. Secure contracts for a contingent sludge management method for use if the first disposal method becomes unavailable by July 1, 1990.

14. Complete construction of chemical fixation facilities by January 1, 1991 and begin shake down period.

15. Initiate full operations of sludge management plan and cease ocean dumping by March 17, 1991.

District: Passaic Valley Sewerage Comm.

Form I-2-2

DISTRICT IMPLEMENTATION SCHEDULE

LONG-TERM ALTERNATIVE

Selected Alternative Reference ID Code: V-B-1

Facility Name: PVSC - Wastewater Treatment Plant

Date

1. RFQ for Design: N/A
2. RFP for Design: 10/1/90
3. Notice Award for Design: 1/1/91
4. Design Complete: 12/31/92
5. RFQ for Construction (if privatized): N/A
6. RFP for Construction (if privatized): N/A
7. Bid Notice for Construction: (if privatized) N/A
8. Notice Award for Construction: (if privatized) N/A
9. Initiation of Construction: 7/1/93
10. Completion of Construction: 7/1/96
11. RFQ for Operation (if privatized): N/A
12. RFP for Operation (if privatized): N/A
13. Notice of Award for Operation: (if privatized) N/A
14. Start of Operations: 7/1/96

District: Passaic Valley Sewerage Comm. Form I-2-1

DISTRICT IMPLEMENTATION SCHEDULE

INTERIM ALTERNATIVE

Selected Alternative Reference ID Code: VI-1B

Facility Name: PVSC-Waste Water Treatment Plant

Date

1. RFQ for Design: N/A
2. RFP for Design: 3/27/89
3. Notice Award for Design: 4/14/89
4. Design Complete: 11/15/89
5. RFQ for Construction (if privatized): N/A
6. RFP for Construction (if privatized): N/A
7. Bid Notice for Construction: (if privatized) N/A
8. Notice Award for Construction: (if privatized) N/A
9. Initiation of Construction: 1/16/90
10. Completion of Construction: 7/1/91
11. RFQ for Operation (if privatized): N/A
12. RFP for Operation (if privatized): N/A
13. Notice of Award for Operation: (if privatized) N/A
14. Start of Operations: 3/17/91

Generator: Rahway Valley Sewerage Authority　Form I-2

IMPLEMENTATION SCHEDULE

Selected Alternative Reference ID Code: ______________

Facility Name: ______________________________

Date

1. RFQ for Design: ____________________
2. RFP for Design: ____________________
3. Notice Award for Design: ____________________
4. Design Complete: ____________________
5. RFQ for Construction (if privatized): ____________________
6. RFP for Construction (if privatized): ____________________
7. Bid Notice for Construction: (if privatized) ____________________
8. Notice Award for Construction: (if privatized) ____________________
9. Initiation of Construction: ____________________
10. Completion of Construction: ____________________
11. RFQ for Operation (if privatized): ____________________
12. RFP for Operation (if privatized): ____________________
13. Notice of Award for Operation: (if privatized) ____________________
14. Start of Operations: ____________________

- December 10, 1989 - Receive certification of construction permit application completeness from all State regulatory agencies.
- January 19,1990 - Receive approved construction permits from NJDEP (Stage 2 Treatment Works Aproval) and any needed local construction permits.
- February 1, 1990 - Advertise for bids for rehabilitation of SDB and construction of new ancillary facilities.
- March 1, 1990 - Receive bids for rehabilitation of SDB and construction of new ancillary facilities.
- March 15, 1990 - Award contracts for rehabilitation and new construction.
- April 15, 1990 - Commence on-site construction activities.
- December, 1990 - Revise O & M manual for Sludge Dewatering Building to reflect new equipment, chlorination facility, and lime stabilization system.
- February, 1991 - Initiate systems training program.
- March 17, 1991 - Complete all construction related activities necessary for operation, including shakedown; and initiate operation of the Sludge Dewatering Building.

Interim Disposal Activities

The selected interim disposal site Community Refuse, Ltd., Greencastle, Pennsylvania) must be under contract to receive dewatered sludge from the RVSA on Monday, March 18, 1991. While it appears that there may be adequate time (two years) to establish a contractual arrangement with these operational facilities, it would be prudent to negotiate these contracts expeditiously.

The initial activities needed to implement these alternatives are to obtain approval of the Pennsylvania

Department of Environmental Resources (PADER) through the Form 43/Module 1 permit major modification application process.

The recommended implementation schedule for the Interim Disposal Activities is as follows:

- April 30, 1989 - Submit Form 43/Module 1 for Community Refuse, Ltd. to PADER
- June 30, 1989 - Receive PADER approval for Community Refuse, Ltd. Form 43/Module 1
- October 31, 1990 - Complete contract negotiations and execute contract with landfill.
- January, 1991 - Submit updated Form 43/Module 1 applications to PADER for CRL
- March 18, 1991 - Initiate interim disposal activities.

Sludge Receiving and Incineration Building

Much work remains to be done in the planning, permitting, and design phases of the SRIB implementation plan before the construction can begin. Recommended key milestones in the SRIB implementation plan include the following:

- April 1, 1989 - Submit air quality modeling protocol to NJDEP.
- May 1, 1989 - Receive approval of air quality modeling protocol.
- May 1, 1989 - Submit air permit application (without modeling) to NJDEP
- June 1, 1989 - Receive approval of emissions and control technology demonstration in permit application.
- June 30, 1989 - Complete preliminary design of the SRIB; submit permit application for Stage 1 Treatment Works Approval to NJDEP.

- July 31, 1989 - Submit modeling portion of application for Air Emissions Permit to NJDEP.
- July 31, 1990 - Receive Air Emissions Permit.
- June 30, 1991 - Solicit proposals for preparation of final engineering designs and related specifications for the SRIB.
- August 30, 1991 - Award contract for preparation of final design plans and specifications.
- May 30, 1993 - Complete preparation of final design plans and specifications; submit completed permit applications for NJDEP Stage 2 Treatment Works Approval and construction permits from the City of Elizabeth.
- August 30, 1993 - Receive Stage 2 Treatment Works Approval from NJDEP and all construction permits from the City of Elizabeth.
- December 10, 1993 - Advertise for bids for procurement of equipment and construction of the SRIB.
- March 10, 1994 - Receive bids for the Sludge Receiving and Incineration Building equipment and construction.
- May 10, 1994 - Award construction and equipment procurement contracts for the SRIB.
- September 10, 1994 - Commence on-site construction activities.
- August 30, 1997 - Commence testing of the SRIB.
- April 30, 1998 - Complete testing of the SRIB and commence full operation.
- July 10, 1998 - Complete all construction-related activities at the SRIB.

Ash Management

Formulation of an ash management implementation plan for the Joint Meeting and RVSA SMF is dependent upon the ability of the Union County Utilities Authority (UCUA) to develop and

- July 31, 1989 - Submit modeling portion of application for Air Emissions Permit to NJDEP.
- July 31, 1990 - Receive Air Emissions Permit.
- June 30, 1991 - Solicit proposals for preparation of final engineering designs and related specifications for the SRIB.
- August 30, 1991 - Award contract for preparation of final design plans and specifications.
- May 30, 1993 - Complete preparation of final design plans and specifications; submit completed permit applications for NJDEP Stage 2 Treatment Works Approval and construction permits from the City of Elizabeth.
- August 30, 1993 - Receive Stage 2 Treatment Works Approval from NJDEP and all construction permits from the City of Elizabeth.
- December 10, 1993 - Advertise for bids for procurement of equipment and construction of the SRIB.
- March 10, 1994 - Receive bids for the Sludge Receiving and Incineration Building equipment and construction.
- May 10, 1994 - Award construction and equipment procurement contracts for the SRIB.
- September 10, 1994 - Commence on-site construction activities.
- August 30, 1997 - Commence testing of the SRIB.
- April 30, 1998 - Complete testing of the SRIB and commence full operation.
- July 10, 1998 - Complete all construction-related activities at the SRIB.

Ash Management

Formulation of an ash management implementation plan for the Joint Meeting and RVSA SMF is dependent upon the ability of the Union County Utilities Authority (UCUA) to develop and

Rahway Valley Sewerage Authority
1050 East Hazelwood Avenue
Rahway, New Jersey 07065

SHORT TERM - SECTION V.C.

1. Complete plans and specifications for rehabilitation of sludge dewatering facility, by December 1, 1989.

2. Submit complete construction permit applications for sludge dewatering facilities, by December 1, 1989.

3. Receive certification of construction permit application completeness from all State regulatory agencies, by December 10, 1989.

3A. Receive determination on TWA Stage II by January 15, 1990. *

4. Advertise for bids for rehabilitation of sludge dewatering facilities, by February 1, 1990.

5. Receive bids for rehabilitation of sludge dewatering facilities, by March 1, 1990.

6. Award contracts for rehabilitation of sludge dewatering facilities, by March 15, 1990.

* Allows NJDEP its 45 days

7. Commence onsite construction activities for rehabilitation of sludge dewatering facilities, by April 15, 1990.

8. Secure contracts for interim management of sewage sludge for the period of time from March 17, 1991, to date upon which alternative system referenced in subparagraph V.A. above becomes operational, by October 30, 1990.

9. Secure contracts for a contingent interim management method for activation if the first interim management method becomes unavailable, by December 30, 1990

10. Complete all construction related activities necessary for operation, including shakedown and initiate operation of interim sludge dewatering facilities and sludge management facilities and cease ocean disposal, by March 17, 1991.

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Rahway Valley Sewerage Authority
1050 East Hazelwood Avenue
Rahway, New Jersey 07065

LONG TERM - SECTION V.B.

1. Commencement of detailed planning to identify the alternative system to be used to insure permanent phaseout and termination of ocean disposal of sewage sludge by NA.

2. Completion of detailed planning and submittal of completed sludge management plan for selected alternative system by April 30, 1989.

2A. Receive determination from NJDPE for the selected alternative system identified in the sludge management plan by June 30, 1989.

2B. Submit air permit application by November 30, 1990.

2C. Receive determination on air permit application by May 30, 1991.

3. Establishment of local pretreatment limits as necessary by March 30, 1995.

4. Advertise or solicit proposals for preparation of final engineering design and related specifications for the selected alternative system by June 30, 1991.

5. Award contract for preparation of final engineering designs and related specifications for the selected alternative system, by August 30, 1991.

6. Complete preparation of final engineering design and related specifications for the alternative system selected by May 30, 1993.

7. Submit application for the Treatment Works Approval Stage II from NJDEP for the alternative system selected, by May 30, 1993.

8. Receive determination on Treatment Works Approval Stage II from NJDEP for the alternative system selected by August 30, 1993.

9. Acquire site(s) for the alternative system selected, by NA.

10. Advertise for bids for procurement of necessary equipment and construction of necessary facilities for the alternative system, by December 10, 1993.

10A. Receive bids for selected alternative system by March 10, 1994.

11. Award contracts for procurement of necessary equipment and construction of necessary facilities for the alternative system by May 10, 1994.

12. Commence all construction activities for the alternative system selected, by September 10, 1994.

Rahway Valley Sewerage Authority

LONG TERM - SECTION V.B. (Cont'd.)

13. Complete all construction related activities necessary for shakedown by March 10, 1997.

14. Commence testing of the alternative system by March 10, 1997.

15. Complete testing of alternative system and commence full operation of alternative system by September 10, 1997.

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and construction of the same; and development and initiation of the ash management plan.

Sludge Management Plan Activities

The remaining activities to be completed in the planning phase of this project are as follows:

- March 9, 1989 - Draft Land-Based Sludge Management Plan (SMP) submitted to the RVSA
- April 7, 1989 - Public Hearing on the Draft SMP
- April 17-21, 1989 - Public Hearings on the EPA/NJDEP/ RVSA Consent Decree and Enforcement Agreement
- April 30, 1989 - Submittal of the SMP to NJDEP
- May 30, 1989 - EPA, DOJ, NJDEP, and the RVSA sign the Consent Decree and Enforcement Agreement
- August 14, 1989 - EPA issues new interim MPRSA permits for ocean disposal of sludge at the 106-mile DMSDS

Sludge Dewatering Building

In order to comply with the deadline for the cessation of ocean disposal by March 17, 1991, the following schedule is recommended for the rehabilitation of the Sludge Dewatering Building and the construction of new chlorination and lime stabilization systems:

- May 8 1987 - Initiate design of new chlorination and lime stabilization systems, initiate testing and evaluation of SDB systems components
- July 10,1989 - Initiate design (plans and specifications) of SDB rehabilitation
- December 1, 1989 - Complete plans and specifications for rehabilitation and new construction, submit completed construction permit applictions for all work.

Attachment 4

PERMIT/APPROVAL PROCESS FOR LAND-BASED SLUDGE MANAGEMENT

INTERIM ALTERNATIVES:

1. Dewatering and Out of State Landfilling:

a. Dewatering Equipment

Permit Required: Treatment Works Approval(TWA) (Water Resources)

Permit Process:
Copy of Application sent to host Municipality for Endorsement (Certified Mail Proof)
TWA Application submitted to NJDEP with proof of request for Municipal Endorsement
60 Day Municipal Endorsement Review Period
Consistency Determinations (Statewide Sludge Management Plan, Water Quality Management Plan, Coastal Areas Facilities Review Areas, Etc.)
Final Determination on Application within 90 days of receipt of complete application (Approvals may be conditioned upon applicant securing permits from other agencies: Eg. Air, CAFRA)

b. Sludge Hauling Trucks

Permit Required: Solid Waste Registration (Solid Waste)

Permit Process:
A 901 Disclosure Review for new Applicants proposing to haul customer sludge (Not applicable where applicant has received prior A 901 Approval or where hauler is the generator) Process takes 9 to 12 months
One Day Turn-around on application after above referenced A 901 Approval

c. Venting of Dewatering Building

Permit Required: Air Emission Permits (Environmental Quality)

Permit Process:
NJDEP Receives Application
Completeness Review
Response to Completeness Review
Determination on Draft Permit
Notice Draft Permit for Public Comment & Hearing
Prepare Response to Comments
Issue Final Permit

d. Out of State Landfill

Permit/Approval Required:
As specified by Host State (Eg. PaDER Module 1)
Bilateral Signed Contract with Landfill
Bilateral Signed Contract with Contingenc

Attachment 4

2. Solidification

a. Solidification Equipment

Permit Required: Treatment Works Approval (TWA) (Water Resources)

Permit Process:
Copy of Application sent to host Municipality for Endorsement (Certified Mail Proof)
TWA Application submitted to NJDEP with proof of request for Municipal Endorsement
60 Day Municipal Endorsement Review Period
Consistency Determinations (Statewide Sludge Management Plan, Water Quality Management Plan, Coastal Areas Facilities Review, etc)
Final Determination on Application within 90 days of receipt of complete application (Approva may be conditioned upon applicant securing permits from other agencies: Eg. Air, CAFR

b. Monitoring and Reporting on Pathogen Reduction

Permit Required: NJPDES Permit (Water Resources)

Permit Process:
Copy of Application sent to Host Municipality for Endorsement (Certified Mail Proof)
NJPDES Application submitted to NJDEP with proof of request for Municipal endorsement
Draft Permit Determination Public Noticed for minimum of 30 days
Public Hearing where significant controversy
Development of Response to Comment Document
Issue Final Permit Determination
30 Day Period to request Adjudicatory Hearing

c. Air Emissions/Odor Control

Permit Required: Air Emission Permit (Environmental Quality)

Permit Process:
NJDEP Receives Application
Completeness Review
Response to Completeness Review
Determination on Draft Permit
Notice Draft Permit for Public Comment & Hearing
Prepare Response to Comments
Issue Final Permit

d. Use of Solidified Product as Daily Landfill Cover

Permit/Approval Required: Determination by the Division of Solid Waste Management that the solidified sludge product satisfied the specifications in the Regulations for Daily Cover materials.

Determination Process:
Field Studies of Product Performance
Laboratory Analysis of Physical Properties
Issuance of Determination letter

Attachment 4

LONG TERM ALTERNATIVES:

1. Incineration:

   a. Air Emissions

      Permit Required: Air Emission Permit (from Environmental Quality)

      Permit Process:
      NJDEP Receives Application
      Completeness Review Round 1
      Response to Round 1 Review
      Completeness Review Round 2
      Response to Round 2 Review
      Determination on Draft Permit
      Notice Draft Permit for Public Comment & Hearing
      Prepare Response to Comments
      Issue Final Permit

   b. Sludge Handling Equipment

      Permit Required: Treatment Works Approval (TWA) (Water Permit)

      Permit Process:
      Copy of Application sent to host Municipality for Endorsement (Certified Mail Proof)
      TWA Application submitted to NJDEP with proof of request for Municipal Endorsement
      60 Day Municipal Endorsement Review Period
      Consistency Determinations (Statewide Sludge Management Plan, Water Quality Management Plan, Coastal Areas Facilities Review Areas, Etc.)
      Final Determination on Application within 90 days of receipt of complete application (Approvals may be conditioned upon applicant securing permits from other agencies: Eg. Air, CAFRA)

   c. Ash Management*

      Permit/Approval Required: Compliance with Waste Flow Rules

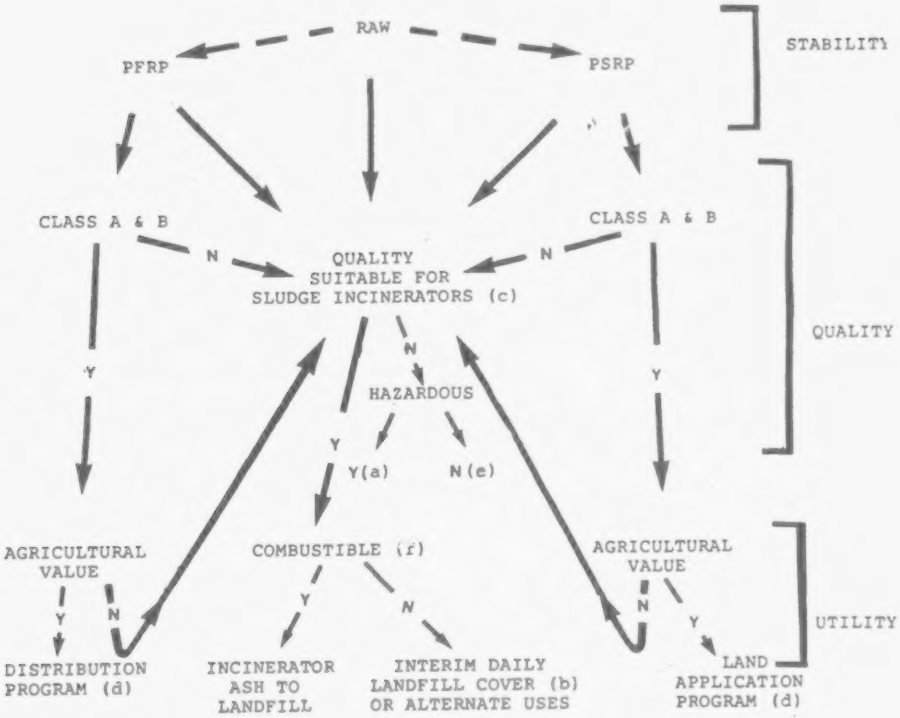
      Permit/Approval Process: Confirmation of the Solid Waste Management District in writing that identifies disposal site location and sufficient capacity

* Preferred Ash Management would be a reuse, recycle, resource recovery option such as vitrification as proposed by Bergen County Utilities Authority.

Attachment [illegible]

Figure 4-I-1:

DECISION MAKING PROCESS
FOR
SELECTING RESIDUAL MANAGEMENT PRACTICES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N
Y
UTILITY
DISTRIBUTION PROGRAM (d)
INCINERATOR ASH TO LANDFILL
INTERIM DAILY LANDFILL COVER (b) OR ALTERNATE USES
LAND APPLICATION PROGRAM (d)

(a) Refer to Hazardous Waste Regulations
(b) Approvals through Bureau of Sanitary Landfill Closure, DWM
(c) Approvals through Bureau of Engineering and Technology Review, DEQ
(d) Approvals through Residuals Management Program
(e) See the section on Class C Sludge in this Part of the SSMP or contact Residuals Management. This sludge may be managed as hazardous or pretreatment may be instituted.
(f) Sewerage treatment plant sludge is combustible in most cases.

Dotted lines indicate that this step can be reached through further treatment of sludge.

Submitted by: New Jersey Department of Environmental Protection
Attachment 6 (REVISED 5/16/89)

SELECTED ALTERNATIVES TO OCEAN DISPOSAL

May, 1989

MUNICIPAL TREATMENT WORKS	SELECTED INTERIM ALTERNATIVE(S)	SELECTED LONG TERM ALTERNATIVE(S)	ESTIMATED IMPLEMENTATION DATES
BERGEN COUNTY UA	chemical solidification and use of product on out of state landfill	thermal reduction on-site	Interim: 3/17/91 Long Term: by 8/95
JOINT MEETING ESSEX & UNION COUNTIES	out of state landfilling	thermal reduction on-site	Interim: 3/17/91 Long Term: by 9/97
LINDEN ROSELLE SA	incineration at Stony Brook RSA	thermal reduction on-site	Interim: 3/17/91 Long Term: by 1/96
MIDDLESEX COUNTY UA	chemical solidification and use of product at Edgeboro Landfill	same as interim	Interim: 3/17/91 Long Term: 3/17/91
PASSAIC VALLEY SEWERAGE COMMISSIONERS	out of state landfilling	thermal reduction on-site	Interim: 3/17/91 Long Term: by 7/96
RAHWAY VALLEY SA	out of state landfilling	thermal reduction at Joint Meeting	Interim: 3/17/91 Long Term: by 9/97

Attachment 7

NEWSPAPER CLIPPINGS

Sep 4 '86

500 call on authority to reject a sludge dewatering plant in Little Ferry

Small borough is already home to a sewage treatment facility

By BILL GANNON

Nearly 500 Little Ferry residents jammed into the borough's Memorial School gymnasium last night to protest a Bergen County Utilities Authority (BCUA) proposal to build a $12.5 million sludge dewatering plant in the town.

"Everything you hear tonight boils down to one thing: We don't want more sewage treatment facilities in Little Ferry," Eugene Barden, a councilman and former mayor, testified at the public hearing.

Speaking to BCUA members before an angry but orderly crowd, Barden recounted a generation of what he called distrust and broken promises between the authority and the 1-square-mile borough perched at the edge of the Hackensack Meadowlands.

"Maybe we are too small a town for you to be worried about. Perhaps that's why everything keeps getting dumped in Little Ferry," Barden said.

"We are telling you we have already done our share. . . . Look for a regional plan with one of the other sewerage authorities, find another site, another town," he added.

Many speakers claimed that the plant would foul the air and impair their health, hurt property values and affect the quality of life for the 11,000 residents.

Mayor Louis Tedesco asked the BCUA to reconsider its decision, urging it not to "force the dewatering plant on the borough," and told the commissioners that the borough would fight the matter "to the Supreme Court, if necessary."

A more worrisome matter for Barden, Tedesco and many residents last night was the possibility that the BCUA may construct a sludge incinerator on the authority's property on Mehrhof Road.

BCUA Executive Director Larry McClure told the crowd that while the need for a dewatering facility in Little Ferry appeared certain, the incinerator proposal was a "last possible option."

"I will do everything in my power to find an alternative to building an incinerator to burn sludge in Little Ferry," McClure said later, repeatedly stating that other alternatives are being explored before the BCUA has to submits its plans to the state by Sunday.

Many residents, however, said they did not trust such BCUA assurances.

McClure noted that the agency is under strict state and federal mandates to find alternatives to ocean dumping of the partially processed human waste by the state's March 1991 deadline.

The alternate sludge disposal plans being examined by the BCUA and the five other agencies in the state that still dump at a site 106 miles off the Shore call for a $12.5 million dewatering facility to be built.

Anthony Sartor, the BCUA's consulting engineer, said the plant would dewater the sludge shipped to the plant from the BCUA's 43 municipalities, greatly reducing its volume and thickening it by treating it with chemicals.

After treatment, the sludge would be shipped to out-of-state landfills for use as cover soil. The same soil is unacceptable for similar use in New Jersey landfills, as the state Department of Environmental Protection (DEP) prohibits the use of treated sludge as a cover for landfills.

Another alternative to preparing the sludge for use as landfill cover is to burn it.

A sludge incinerator for the Little Ferry site is under consideration by the authority.

McClure said the BCUA's incinerator option was in the "very early proposal stage" and was far from certain.

He noted that a regional agreement with an existing sludge incinerator, composting the material, or using other disposal options through incineration by private firms were viable disposal options.

One matter of debate among the attorneys attending last night's hearing was whether the BCUA was obliged to bring the plan before the Bergen County Board of Freeholders for final approval.

BCUA attorney Stephen Sinisi said a recent memo from the DEP's Solid Waste Management Division allows the authority to seek a final facility construction approval from the DEP without going back to the freeholders, who normally would have to approve an amendment to the county's solid waste management plan.

But Freeholder Linda Baer, an attorney, said recent case law established that sludge is solid waste and any sludge disposal plans required an amended solid waste management plan by the county freeholders.

"This matter is supposed to come before us. We should be making the final decision on this matter. I have no intention of allowing this to be rammed through," Baer said.

Moreover, she said, the time has come to divest the BCUA of its solid waste responsibilities and return that role to the freeholders.

She contended that because the appointed nine-member BCUA commissioners' terms are five years, they are not as responsible to county residents as the freeholders.

Some of the residents' comments last night focused on complaints against the BCUA's Little Ferry sewage treatment plant.

Several residents said the BCUA should work to improve the plant before proposing a new facility that could affect them.

Recounting sweltering summer nights when they were forced to shut their windows against the putrid smells from the plant, many residents said their community has done its fair share and asked that another site be found.

4/2/85

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-8 THE RECORD 2/22/89

The Record
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The dumping ban is insane

It seemed like a good idea last year to ban the dumping of sewage sludge into the ocean. But that was before anyone had done the arithmetic on it. Now it's clear that the ban could bankrupt every dumper affected, including six utility authorities in northern New Jersey.

The ban, imposed by Congress and the New Jersey Legislature, outlaws dumping after 1991 at the only site that's now legal, 106 miles off Cape May. The prohibition was rushed through both legislatures in an emotional response to beaches washed with sewage and syringes. There was no time to think of the price, whose true extent is now becoming apparent.

The Passaic Valley Sewerage Commission has put a preliminary price tag on alternative means of getting rid of sewage sludge. Shipping it to Pennsylvania, while awaiting completion of an incinerator, could cost as much as $50 million a year, says the PVSC. Building the incinerator itself will cost $500 million. The Bergen County Utilities Authority hasn't made an estimate of sludge-hauling costs yet.

Whatever they are, they promise to be more than the payers will stand for. Northern New Jersey's six utilities authorities are all in roughly the same fix. Sewer-treatment and garbage-disposal rates are up sharply. It costs $100 a ton and more to haul garbage to Pennsylvania, and Pennsylvania's patience shows signs of wearing thin. There may be few sites left for sludge in Pennsylvania, and certainly no low-priced ones.

There's more bad news to come. New Jersey authorities have a state-mandated deadline of March 17, 1991 to end the ocean dumping of their sludge. The federal deadline, which applies to all dumpers in both New York and New Jersey, is Dec. 31, 1991. Any authority dumping after that date will be subject to fines laid out in a complex schedule by the federal Environmental Protection Agency. New Jersey dumpers failing to meet the state's March deadline will owe additional fines to New Jersey.

There's little likelihood that sludge incinerators could be ready to operate within the next two years. The grim prospect is that the BCUA, the PVSC, and the other northern New Jersey authorities will be laying out huge sums to ship sludge out-of-state, plus hundreds of millions in capital costs to build incinerators — and on top of that, horrendous state and federal fines for failing to meet deadlines that are already hopelessly beyond reach.

In addition to the state fine of $50,000 daily, New Jersey dumpers face a federal fine of $600 per dry ton of sludge dumped after Dec. 31, 1991. The six New Jersey dumpers could wind up owing a combined total of $125 million for 1992. The federal fines rise sharply after 1992. The fines are supposed to be a kind of enforced saving, to be returned eventually to the utilities authorities to help pay for incineration and other sludge-disposal facilities. But the money will come first from the hides of ratepayers and taxpayers.

The sludge legislation, federal and state, is little short of insane. There is no evidence at all that dumping at the 106-mile site contributed to the pollution that spoiled the 1987 and 1988 shore seasons. As late as 1987, the congressional Office of Technology Assessment said there were no known ill effects from dumping sludge far out at sea, as long as most heavy-metal contaminants had been removed. The laws were passed despite that finding, with no study of the many viable alternatives, and not a thought as to how the beleaguered citizens would pay the price for headlong irresponsibility. It's time to repeal those laws now.

A small step toward peace

Stop

Editor, The Record:
"America up in Ar
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BUREAU OF PRE TREATMENT
& RESIDUALS

4/4

Adviser: Bills to rise as ocean dumping ends

By TED SERRILL
Home News staff writer

The Home News
Friday, Feb. 24, 1989

SAYREVILLE — Households served by the Middlesex County Utilities Authority will pay 9 cents a day more, or $32.58 a year, to dispose of sewage sludge on land, a consultant to the authority estimated yesterday.

The authority's plan to dispose of sewage sludge by chemical fixation — creating a synthetic soil that can be used for a landfill cover — was explained at a public hearing by Alan Jacobs, a principal of Jacobs/WFC of Sayreville.

The plan is considerably more expensive than towing the sludge out to sea and dumping it, he said. However, both the state and Congress have ordered an end to ocean dumping.

Jacobs estimated that in 1992, the first full year of chemical fixation, the authority's budget will rise by a net of more than $11 million, compared with this year's budget.

Average households that now pay $63.79 a year for disposal of the semisolid residue from the treatment of sewage would pay $96.37 a year, Jacobs estimated.

No criticism of the MCUA's plan was heard during the 80-minute mandated hearing. In fact, praise was provided by a representative for Clean Water Action — an organization formerly on the opposite side of the fence from the authority because it was instrumental in gaining an end to ocean dumping.

The MCUA is the only sewerage authority of those now dumping sludge 106 miles out at sea to plan to reuse the sludge instead of incinerating it, said Cindy Zipf, coordinator of Clean Water Action.

The proper action, she said, is "utilization of the properties of sludge, rather than incineration."

The authority is under state mandate to end ocean dumping by March 17, 1991. Chemical fixation is the only land-based method that can be implemented by that deadline, said Jacobs.

The authority has selected a site for the chemical fixation plant, which would cost $67 million to build. The site is near the juncture of the authority's access road from Chevalier Avenue and the planned Main Street extension.

The site adjoins the site of the Middlesex County Fire Training Academy, on which construction will start within the year.

Consultant hired

The authority will appraise the right of way on its property that will be taken by Sayreville for the new road. An engineering consultant, Berson, Ackerman & Associates of Woodbridge, was hired yesterday for up to $10,750 to evaluate the impact of the extension on the authority's property. Its report will be used by the appraisers.

Sludge can be chemically transformed into a silty, claylike substance by several methods. A common method is adding cement and sand.

The resulting slightly moist, but crumbly substance would be used to daily cover garbage and refuse, and later garbage incinerator ash, at the Edgeboro Landfill in East Brunswick.

The total annual budget for the dewatering and chemical fixation, including $5.6 million annual debt service, would be $17.1 million, Jacobs estimated. The net $11 million budget is computed in part by deducting the nearly $4.2 million annual cost of ocean dumping.

The authority this year began setting aside $100 for each dry ton of sludge dumped at sea. Under federal law, the money is put into an escrow account and will be paid back regularly to the authority by the U.S. Environmental Protection Agency when a land-based sludge disposal plan is approved.

The anticipated payback of millions of dollars from that escrow fund was also calculated into the net annual savings by Jacobs.

The MCUA plans to submit its preliminary plan and a permit application to the state Department of Environmental Protection by April 30. The package will include the transcript of yesterday's hearing and any written comments to be received over the next 10 days.

After the chemical fixation process is under way, the authority plans to add a sludge drying process. This process produces a "pretty good fertilizer," said Jacobs. It will be needed as an optional method of disposing of sludge when the authority's planned garbage-to-energy incinerator is built in Sayreville, and the amount of material dumped at Edgeboro is considerably diminished, decreasing the amount of landfill cover needed each day.

Sludge drying would only be undertaken if firm markets for the purchase of the resulting fertilizer can be signed up. The material could sell for about $75 a ton, said Jacobs.

SLUDGE PLAN SLAMMED

Officials, residents fault proposed Newark incinerator

By JUDY PEET

Environmentalists joined Newark legislators and city residents yesterday in lambasting a proposal by the Passaic Valley Sewerage Commission (PVSC) to build the "world's largest sludge incinerator" in the Ironbound section of Newark.

Outraged environmental and neighborhood groups joined Newark Mayor Sharpe James, City Council President Henry Martinez and Essex County Freeholder Joseph Parlavecchio in pledging to "use every resource we have" to block the incinerator plan in court.

"No sludge incinerator will be built in Newark, no matter what the cost" to fight it, declared Martinez, who said the council Wednesday night adopted an emergency resolution authorizing immediate legal action.

Parlavecchio, who said the sludge incinerator threatened to create another "Love Canal" in the Ironbound, said he intends to introduce a similar resolution on the county level "to stop this insanity."

"Newark already is the host city to a solid waste incinerator, which is under construction, several solid waste transfer stations, a major hazardous waste treatment facility, a sewer authority, a methadone treatment facility, a halfway house, a state prison and an airport," James said, detailing the city's share of "undesirable tax-exempt facilities."

He added, "We will tolerate no more."

At issue is the PVSC proposal to build a $350 million, double-stack pair of incinerators at its plant at Doremus and Wilson avenues. Scheduled to go into operation in 1996, the site is about a mile from the site of a county-proposed solid waste incinerator, which local residents are also fighting.

The commissioners noted at the outset of the 2 p.m. hearing that they are under a 1991 deadline to stop ocean dumping of sludge. The PVSC plan—outlined only in a four-page summary which did not address environmental impact, actual costs or alternatives to incineration—included building interim facilities which would partially process the sludge before it would be trucked out of state between 1991 and 1996.

Sludge is the collected residue from the treatment of liquid wastes. Environmentalists said the concept of burning sludge is wasteful, expensive and dangerous, because the process could release highly hazardous chemicals into the air. Disposing of toxic ash residue created by the process is also a major concern.

"Twenty-five percent of the country is beneficially reusing sludge" through reclamation and composting projects, said Greenpeace representative Fred Munson, adding that "just because you are getting sludge out of the ocean, doesn't mean incineration is acceptable.

"This proposal is not only dangerous, it is incredibly expensive," Munson told the commission. "What you are saying is either completely uninformed or a lie."

The commissioners sat impassively as dozens of speakers at the public hearing harshly criticized not only the proposal, but the PVSC's methods in presenting its plans to the public.

"Not only is the plan itself an outrage, this hearing is a fraud," declared Arnold Cohen, spokesman for the Ironbound Committee Against Toxic Waste. "You set up a hearing at a ridiculous time, at a site impossible to get to, and refuse to give advance information or any specific details on the plan."

On March 20, the PVSC announced it would hold a single public hearing in the middle of the afternoon at the Holiday Inn North, adjacent to Newark Airport. The hotel cannot be reached by public transportation, although the Ironbound committee did hire a bus to transport more than 50 irate Ironbound residents.

The commissioners claimed they are under a tight schedule ordered by the state Department of Environmental Protection (DEP), but said they will ask the department for permission to hold another hearing.

Armando Fontoura, president of the Portuguese-American Congress—which represents the largest ethnic group in the 50,000-resident East Ward—accused the commission of settling on the Ironbound site "because you think, since our people are hard-working and take care of themselves, they are passive.

"I am here to say you are making a horrible mistake. Maybe you thought you could sneak in this outrageous plan, but you are in for a shock. We will fight you at every turn, in every way imaginable."

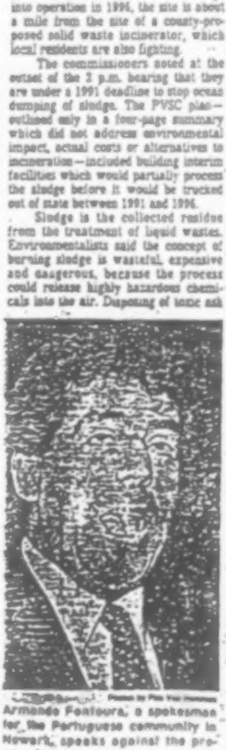
Angry opponents also noted that the commission did not allow public access to its full, two-volume study, providing only the small "summary" as a basis for

"You must be rookies in the public hearing business. This (hearing) is an insult," declared Victor DeLuca, president of the Ironbound Community Corporation. "We are a neighborhood under siege (from pollution). You're talking state-of-art technology, but we're talking the state of our health."

Newark Mayor Sharpe James was particularly critical of the authority's failure to provide the city with advance plans on the project, which he said will emit poisonous fumes, create contaminated byproducts and "waste millions of taxpayers' dollars."

"The scurrilous attempt to ramrod an environmentally unsound facility in Newark, under the guise of federal law and NJDEP mandate, will not be tolerated and is an unacceptable bureaucratic scramble to create a political uproar," he said.

Arnold Cohen of the Ironbound Committee Against Toxic Waste testifies at the Passaic Valley Sewerage Commission hearing on a proposed sludge incinerator in Newark



Armando Fontoura, a spokesman for the Portuguese community in Newark, speaks against the proposed sludge incinerator at the hearing in Newark

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DONALD TUCKER

COMMISSIONERS

Passaic Valley
Sewerage Commissioners

600 WILSON AVENUE
NEWARK, N.J. 07105
(201) 344-1800
Fax: (201) 344-2951

CARMINE T. PERRAPATO
EXECUTIVE DIRECTOR

ROBERT J. DAVENPORT
DEPUTY EXECUTIVE DIRECTOR

JAMES M. PIRO
CHIEF COUNSEL

NORMAN E. DARMSTATTER
CLERK

STATEMENT ON

"THE OCEAN DUMPING ACT OF 1988"

FOR THE

HOUSE SUBCOMMITTEES ON

OCEANOGRAPHY AND THE GREAT LAKES,

OVERSIGHT AND INVESTIGATIONS, AND

FISHERIES AND WILDLIFE CONSERVATION

AND THE ENVIRONMENT

MAY 16, 1989

Thank you Mr. Chairman. My name is Sheldon Lipke, and I am the Superintendent of Plant Operations for the Passaic Valley Sewerage Commissioners. On behalf of the Commissioners, I would like to thank you for the opportunity to present our experiences in trying to implement the provisions of the Ocean Dumping Ban Act of 1988.

The Passaic Valley Sewerage Commissioners is one of six Agencies who dispose of sludge at the 106 mile dumpsite. All the Agencies have agreed to end ocean dumping by the N.J. State mandated deadline of March 17, 1991, over nine months before the Federal deadline of December 31 of that year.

Today, I would like to discuss the status of our compliance/enforcement agreement with EPA and the progress we are making to implement a land-based alternative to ocean dumping.

As called for in the Act, the six Agencies held a series of meetings with the EPA and the NJDEP to work out the required agreement. The Agencies submitted schedules which would end ocean dumping on March 17, 1991. We even agreed to stipulated penalties for missing intermediate milestones. In spite of our willingness to enter into a compliance agreement and end ocean dumping, the EPA insisted upon an enforcement agreement. From both a monetary and equity viewpoint, we could not enter into an enforcement agreement when we agreed to comply with the statute. We reluctantly filed suit in U.S. District Court to affirm our contention that we should enter into a compliance agreement rather than an enforcement agreement. When this issue is resolved, we believe that the agreements can be quickly finalized, as the other issues involved are relatively minor in nature.

Whether or not we have an agreement, the six Agencies are pressing forward with their land-based plans. Of the six, the Middlesex County Utilities Authority alone has found an in-state solution which can be implemented by 1991. They propose to chemically treat the sludge to turn it into a soil-like material suitable for use as a cover material in a landfill. The uniqueness of their solution is that they own and operate the last major landfill in northern New Jersey.

The remaining five Agencies are not so fortunate. The Northern New Jersey areas they serve send their trash to landfills in Pennsylvania, Ohio, and other states. These out-of-state landfills have no desire to accept daily cover material, even at no cost, but would rather take the sludge as a waste for a large disposal fee. Therefore, this option has been closed to the other five Agencies.

With such little time remaining until 1991, the only feasible interim alternative is the landfilling of dewatered treated sludge in out-of-state solid waste landfills. At PVSC, we estimate that an average of 75 trailer truck loads of sludge will be shipped to landfills each day. For us, the cost of this alternative will be about $50 million per year. By way of comparison, our total budget for 1989, including sludge removal and debt service, is $62 million. Our sewer rates will therefore increase by about 80% starting in 1991. The bulk of the costs will be paid by the poorest cities in the state such as Newark, Paterson, and Jersey City.

The long-term alternative selected by the five Agencies will be various types of incineration. Because we are one of the largest sludge producers in the world at 560 dry tons per day, PVSC proposes to build the world's largest sludge incinerator complex in Newark, New Jersey. We hired a nationally prominent environmental engineering firm to design a facility which would meet the stringent air pollution requirements of the NJDEP. They researched technologies in the US, Europe, and Japan to come up with a reliable system which could do the job. We are satisfied that what we propose will be the state-of-the-art in sludge incineration technology.

But all that didn't help us when we held our first public hearing on the sludge plan! The incinerator plan was received with a wave of negative reaction by the people living near the proposed facility. Just as we expected, the people want a halt to ocean dumping, but do not want the solution to be in their back yard. In spite of their initial reaction, we hope to gain the acceptance of our neighbors, and proceed with the long-term incineration alternative.

In closing, the six New Jersey Sewerage Agencies have agreed to end the ocean dumping of sewage sludge by March 17, 1991. We are currently designing the facilities necessary to convert the liquid sludge which we dispose of at sea into a dry "cake" material suitable for land disposal. We are pledged to do everything in our control to meet that date.

I would be happy to answer any questions that you may have. Thank you again for this opportunity to appear before your committee.

PASSAIC VALLEY SEWERAGE COMMISSIONERS
NEWARK, NEW JERSEY

Citizen Summary

LAND-BASED SLUDGE FACILITIES PLANS

April 1989

CAMP DRESSER & McKEE INC.

CITIZEN SUMMARY

Under New Jersey law, the Passaic Valley Sewerage Commissioners must cease dumping sludge in the ocean by March 17, 1991. To assist PVSC in meeting this goal, the Commissioners engaged the environmental consulting firm of Camp Dresser & McKee Inc. to develop plans for interim and long-term disposal of sludge. This summary describes the recommended plan.

EXISTING CONDITIONS

The PVSC plant is located in the Ironbound section of Newark, at the intersection of Wilson and Doremus Avenues. It was constructed to treat wastewater from four counties in the Passaic Valley, but, in recent years, more communities have been added to the service area. By the summer of 1990, it is expected that the population served by the plant will be about 1.42 million. In addition to serving residential areas, the plant also serves heavily industrialized areas.

The liquid treatment processes at the plant include influent pumping, preliminary treatment (removal of screening and grit), primary treatment, oxygen activated-sludge treatment, disinfection with chlorine, and effluent pumping to an outfall in New York Harbor. This treatment train provides two sources of sludge: from the primary clarifiers and waste activated sludge from the secondary clarifiers.

The primary sludge is passed through cyclones to remove grit. The degritted primary sludge and the waste activated sludge are then thickened together in gravity thickeners. The gravity-thickened sludge is treated in intermediate-pressure Zimpro facilities, to decrease the volatile content and to stabilize the sludge. The stabilized sludge is thickened in decant tanks, stored, and then barged to the ocean for disposal. Supernatant from the decant tanks is treated in a separate activated sludge treatment plant and the effluent from that plant is returned to the main treatment plant. Waste activated sludge from the supernatant treatment plant is sent to the gravity thickeners.

INTERIM PLAN

This plan was developed because the long-term facilities will not be on line by March 1991. (In fact, the long-term facilities will not go on line until late 1996.) For the interval from March 17, 1991 (when ocean dumping must end) until the long-term facilities go on line, sludge from the PVSC plant will have to be landfilled outside of New Jersey. Before landfilling, the sludge will have to be conditioned for dewatering and stabilized to decrease odors and potential health problems.

The total capacity of the interim facilities will have to be sufficient to handle the sludge produced in 1996, when the long-term facilities are scheduled to go on line. At that time, the flows to the plant will average about 300 mgd (vs 230 mgd in 1987). Flows in 1996 will be essentially the same as in 2015, the end of the planning period for the long-term facilities. (Nearly all of the projected increase between now and 2015 will be due to new municipal connections, all of which are projected to be completed before 1995.)

Because of the very short time between now and March 1991, maximum use will have to be made of the existing Zimpro reactors and filter presses. In addition, more capacity for conditioning and dewatering sludge will be provided by installing centrifuges (suitable for use later in the long-term plan) in a temporary building. Seven centrifuges will be provided, enough to dewater the difference between the maximum sludge production rate and the reliable capacity of the Zimpro units and the filter presses. The sludge would require polymer conditioning prior to centrifuge dewatering. Because polymers do not stabilize the sludge, the sludge cake would be mixed with lime, for stabilization before hauling to landfill.

Cake storage and hauling facilities will also be provided. The storage facilities would be large enough to provide three days of storage. This storage would be required to accommodate an 8 hour per day, 5 day per week hauling schedule and to provide for unexpected and holiday needs.

To improve operations of the Zimpro and filter press systems, modifications and improvements are recommended to both systems. In addition, new pumps will have to be added or modified to pump sludge from existing to new facilities.

LONG-TERM PLAN

The recommended long-term plan builds on the facilities plan completed in the late 1970's. This plan recommended that the sludge be incinerated and that the resulting ash be landfilled; however, the incinerators were never built. The New Jersey Department of Environmental Protection (NJDEP) and the U.S. Environmental Protection Agency never acted on the permit applications, whose approval was required before construction could begin. The agencies were primarily concerned with the proposed air pollution equipment's inability to control emissions. In a May 1988 letter sent to PVSC, the NJDEP stated that it now believes advances in the art of air pollution control are sufficient that facilities can be built and operated to meet their previous concerns.

Under the recommended plan, the existing Zimpro and filter-press facilities would be moth-balled. They would be replaced by polymer conditioning and centrifuge dewatering, followed by incineration in fluid-bed incinerators and landfilling of incinerator ash.

The conditioning, dewatering, and combustion facilities would be housed in two complexes, one near the intersection of Doremus Avenue and Wilson Avenue and another at the site of the existing but unused storage tanks between the dewatering building and Newark Bay. Each module would consist of six centrifuges (and accompanying polymer-conditioning equipment) and four incinerators with 20-foot beds. Each incinerator will have its own system for recovering waste heat and controlling air pollution. The air pollution control equipment for each incinerator would include a dry electrostatic precipitator and a Venturi scrubber for removing particulates, and a wet tray scrubber for acid gas control. The flues from the furnaces in each complex would discharge through a single stack.

Tanks now used for storing sludge before it is hauled to the ocean will be used for storage of sludge during periods of peak production. Use of these tanks allows for decreasing design capacity of downstream facilities. In addition, a single power-generation facility serving both complexes will be provided. Power generated by this facility will provide about three quarters of the needs of the entire treatment plant.

Before the incineration facility can be constructed air quality permits must be obtained from the State of New Jersey. The analysis needed to meet the permitting requirements is not yet complete. But preliminary modeling to determine environmental impacts shows that the combustion facility will meet air quality requirements.

Design, construction and start-up of the facility will require until late 1996, more than five years past the mandated deadline when ocean dumping must cease. Between March 17, 1991 and start-up, interim facilities will have to be used.

ESTIMATED COSTS

Estimated costs for construction (including engineering and contingencies) and for operation and maintenance are as follows:

	Interim	Long-term
Construction Costs	$22,000,000	$340,000,000
Annual costs for operation and maintenance	$53,000,000	$ 16,000,000
Annual debt service	$ 2,000,000	$ 33,000,000
Total annual costs	$55,000,000	$ 49,000,000

These costs are based on current costs. When the facilities are built, actual costs will be higher, because of escalation.

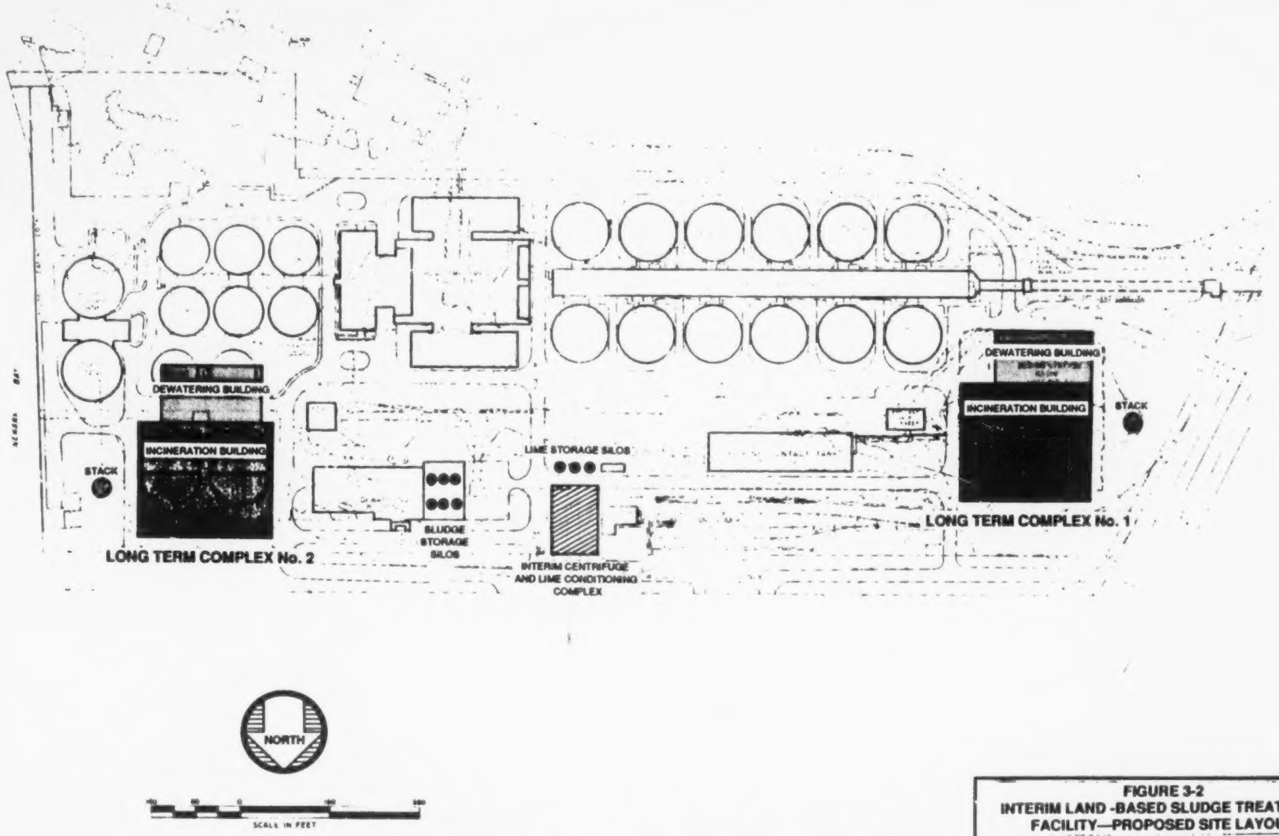

LONG TERM COMPLEX No. 2
DEWATERING BUILDING
INCINERATION BUILDING
STACK
SLUDGE STORAGE SILOS
LIME STORAGE SILOS
INTERIM CENTRIFUGE AND LIME CONDITIONING COMPLEX
LONG TERM COMPLEX No. 1
DEWATERING BUILDING
INCINERATION BUILDING
STACK
NORTH
100
50
0
100
200
SCALE IN FEET

FIGURE 3-2
INTERIM LAND -BASED SLUDGE TREATMENT FACILITY—PROPOSED SITE LAYOUT

Passaic Valley Sewerage Commissioners
Camp Dresser & McKee
March 1989

STATEMENT ON OCEAN DUMPING BAN ACT OF 1988
NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS
NASSAU COUNTY, NEW YORK
MAY 16, 1989

BACKGROUND:

Nassau County currently disposes approximately 200 million gallons per year of digested sewage sludge at the Deepwater Municipal Dump Site (106 Mile Site). This equates to 550,000 gallons per day or 45 tons per day on a dry weight basis.

Nassau County has had no objection to the cessation of ocean dumping of sludge, and in fact we had formulated a plan and developed a schedule to stop ocean dumping prior to the passage of the Ocean Dumping Ban Act of 1988.

In the fall of 1987, Nassau County solicited and received proposals from various consultants interested in providing services with respect to sludge management planning. In early 1988, we selected the consulting firm of Greeley and Hansen Engineers, and authorized them to proceed with a study to identify and evaluate available technological alternatives to the ocean disposal of sewage sludge. This report was received by Nassau County in December of 1988.

Issue No. 1: "the status of negotiations for compliance or enforcement agreements, including schedules for ending ocean dumping and alternative plans"

Concurrently, we are negotiating with the Environmental Protection Agency to establish a schedule for the removal of our sludge from the ocean. This negotiation began early in 1988 as part of the ocean disposal permit process (see Attachment No. 1, letter dated January 19, 1988). On March 17, 1988 a schedule was submitted to the USEPA (Attachment 2) which included the following milestones:

1. 50% of our sludge volume out of the ocean by 6/30/91 - This would be accomplished by renovating and operating an existing sludge dewatering facility at our Cedar Creek Water Pollution Control Plant. This dewatering facility was completed in March of 1982 but has been out of operation since that time. The dewatered sludge would be transported to an available landfill for disposal.

2. 100% of our sludge volume out of the ocean by 7/31/95 - This would be accomplished by the selection, design and construction of dewatering facilities for our Bay Park Treatment Plant and sludge processing facilities to handle our total sludge production.

On August 4th a call was received from Mr. Richard L. Caspe, of the USEPA, concerning a bill to ban ocean dumping of sewage sludge by 1992. Mr. Steven A. Fangmann, of the Division of Sanitation and Water Supply of the Department of Public Works, agreed by telephone conversation with Mr. Caspe that a final schedule would include a date of December 31, 1994 for 100% of our sludge volume to be out of the ocean (see Attachment 3, Memorandum of August 9, 1988).

The time frames set forth in this schedule allow us to exercise proper planning procedures based on sound engineering judgment and evaluations. Additionally, and just as importantly, it allows us to establish a complete public participation program to involve the general populace of the County, and more specifically the local populace which resides in the immediate vicinities of the existing treatment plants. Both the Cedar Creek and Bay Park Plants are surrounded by residential communities which are represented by very active civic groups.

We have a long history of public involvement and concern over treatment plant operations and the potential for odor, traffic and noise impacts upon the local communities. We have developed and nurtured open channels of communication between the public and the County's operating and policy making personnel. It is our intention to involve the public in the entire alternative selection process so that the long term sludge management plan selected by Nassau County will represent the best possible solution on a technical, economical, and social basis.

As an elected public official, Nassau County Executive Thomas Gulotta must remain responsive to the needs and concerns of his constituency. We feel that these needs, as well as the appropriate engineering criteria, have been adequately and properly accounted for in our previously agreed to schedule.

Following the passage of the Ocean Dumping Ban Act, the EPA and subsequently the U.S. Department of Justice established a new position. On December 2, 1988 we were advised at a meeting at the USEPA that a schedule had been established for meeting the August 14, 1989 date in the act for finalization of an ocean disposal permit and enforcement schedule. The schedule required all of the ocean disposers to complete schedules and forward them to the USEPA by January 3, 1989.

The County, by letter dated January 6, 1989, forwarded our alternative plan and phase out schedule to the USEPA. This schedule called for Nassau County to end the ocean disposal of sewage sludge by December 31, 1991. It was proposed that the County would accomplish this by issuing a joint Request for Proposal (RFP) with the County of Westchester in identifying a feasible alternative from the responses received (see Attachment 4). Nassau County in the letter reserved its right to prolong the implementation schedule beyond December 31, 1991 should the RFP fail to yield a feasible alternative. In that event, it was proposed that a second schedule would come into affect which would include a final plan by December 31, 1994. The length of time needed was based on the necessity to properly plan and implement a workable land-based alternative. Such an alternative would have to be constructed at existing facilities and would have to be a plan which would call for the County to be out of the ocean on a long-term basis. This letter of January 6th also resubmitted the schedule for start-up of the Cedar Creek sludge dewatering facility and called for that to be completed by December 31, 1991. At a meeting held on 2/6/89 and at subsequent meetings held at the USEPA (see Attachment 5) the County was advised that December 31, 1991 was the law. Therefore, aside from negotiating long-term schedules it is now being demanded that interim solutions be implemented and that all ocean dumping cease by the end of 1991.

During the meetings the County detailed why the December 31, 1991 date was not possible. In order to receive proper public input, evaluate impact of odor, noise, and traffic and determine that a landfill site is available, the County proposed that the above referenced schedule be accepted by the USEPA. We were advised that an enforcement agreement would only be considered and that such agreement would allow for changed conditions by placing force majeur clauses in such an agreement. Basically, since it would not be possible to meet a December 31, 1991 date, various clauses would be put in the agreement which would consider such items as failure to receive proper bids, proper permits, etc., which would be outside of our control. However, penalties were provided for missing any of the dates listed in the enforcement agreement. These penalties go beyond the Ocean Dumping Ban Act requirement. In summary, in exchange for entering into an enforcement agreement and an ocean dumping permit to continue to discharge at the 106-Mile Site past August 14th of this year the County would be liable for penalties of $10,000 to $50,000 per day from the day that the performance or noncompliance occurs. It would still have to be determined if the missed date was outside of the County's control. Such a schedule to meet the December 31, 1991 date allows only for technological and cost effective parameters to be looked at. It is the County's opinion that the December 31, 1991 date does not allow for feasible alternatives to be properly evaluated. Feasible alternatives would include environmental and social concerns as well as technological and cost effective ones.

What this means for Nassau County is that we must immediately begin the design and subsequent construction of a sludge dewatering facility at the Bay Park Sewage Treatment Plant. No other location or alternative could be considered within the allotted time period. We strenuously object to this position for the following reasons:

1. The construction of this facility will place a large capital burden on the County's taxpayers which may be unnecessary or have to be duplicated if it does not fit into our long-range plans. This is possible under the following two scenarios.
    a. Nassau County, in cooperation with Westchester County, will be issuing a Request for Proposals for sludge disposal services. This proposal has already been circulated in draft form for comments. The final RFP will be issued in June with the receipt of proposals scheduled for August. Should this effort be successful, it would not be necessary for Nassau County to construct any additional facilities, as this will be the responsibility of the vendor.
    b. Nassau County has identified an alternate site for the construction of dewatering and sludge processing facilities remote from the Cedar Creek and Bay Park Plants. If the development of this site proves feasible, then a dewatering facility at Bay Park would not be required. A site feasibility study is necessary with full State Environmental Quality Review Act (SEQRA) review.
2. The imposition of a dewatering facility on the citizens of Bay Park without prior consultation and proper public participation activities will place an unbearable strain on our relations with the community. As stated earlier, we have a long history of involvement with these people and have maintained good relations only through a firm commitment toward open communications and cooperative planning. Their objections to a dewatering facility have already been strongly expressed.
3. If a landfill site is not available on December 31, 1991, the dewatering facilities will not be usable at a local cost of 40 million dollars (no State or Federal aid).

When these arguments were presented to the EPA and the Department of Justice during negotiation sessions for enforcement agreement, they simply responded that this was no concern of theirs, their only function being to enforce the law.

It is our position that the law allows for continued ocean dumping of sewage sludge beyond December 31, 1991 providing that the stipulated penalties are paid and that an acceptable schedule for compliance has been agreed to. Further, it is our position that an acceptable schedule for Nassau County was developed and submitted on January 6, 1989.

The establishment, at this point, of an interim milestone requiring the cessation of all ocean dumping by the end of 1991 represents an unreasonable and unnecessary burden on the taxpayers of Nassau County which is not required by the Ocean Dumping Ban Act of 1988.

We strongly urge that sufficient time periods be allowed for the proper planning, design, and construction of any sludge handling facility that the interim milestone created by the EPA and the Department of Justice be abandoned and that our original schedule remain in effect.

Issue No. 2: "the status and terms of proposed permits"

The USEPA recently conducted a public hearing on April 26, 1989 pertaining to comments on the proposed ocean dumping permit for Nassau County and the other sludge dumpers. Our comments to EPA by letter dated April 21, 1989 (see Attachment No. 6) concerned the allowable sludge discharge rate at the 106-Mile Site. According to the proposed permit, Nassau County is being limited to a discharge rate of 2,694 gpm at a vessel speed of 6 knots. Previous maximum rate was 15,500 gpm. Our data collected in 1987 and 1988 shows that utilizing the same parameter at the discharge rate of 6 knots should be 9,200 gpm. Nassau County has proposed that an interim discharge rate of 7,200 gpm at a vessel speed of 6 knots be incorporated into the new permit. In good faith, the County has already advised its contractor to dispose at the 7,200 gpm rate. Based on the limited sampling data available to the EPA's contractor, Battelle Ocean Services, it would be warranted that based on our two years of data that a discharge rate of 7,200 gpm be allowed until such time as additional sampling data is required which can be submitted to the USEPA for their evaluation. It felt that this discharge rate will also aid in logistic management of dump site traffic.

Also pertaining to the permit, Nassau County has commented to the USEPA that the West Long Beach Sewer District, which generates approximately 5,000 gallons a week of sludge, be incorporated into the proposed ocean dumping permit. At the present time the West Long Beach Sewer District is incorporated in the County's ocean dumping permit. However, based on a letter received from the USEPA the County advised the West Long Beach Sewer District that it could file for its own ocean dumping permit. Subsequently, the USEPA reversed its decision and advised West Long Beach that it could not file for its own permit. The County is attempting to reinstate West Long Beach in its ocean dumping permit with the further intention that West Long Beach would be included in the County's long-term sludge disposal alternative and all planning activities (Attachment No. 7 - letters of April 26 and April 3, 1989).

Also concerning the ocean dumping permit, we have been advised that such permit will not be issued unless the enforcement agreements referenced above are finalized.

Issue No. 3: "the status of plans for monitoring both for regulatory compliance and environmental impacts of sludge disposal, including the recent EPA Inspector General report on monitoring at the 106-Mile Site"

The County has cooperated fully with the USEPA and feels that we are in complete compliance with EPA's plans and has included the Tier I monitoring requirements in our new sludge dumping contract which bids have recently been received on.

Issue No. 4: "implementation of Section 1007 of P.L. 100-688 on ocean discharges"

It is our understanding that this section was under EPA's jurisdiction.

Issue No. 5: "de-designation of the industrial waste site at the 106-Mile Site"

The County would be in favor of de-designation of the industrial waste site.

Issue No. 6: "the practicality and feasibility of technological alternatives to ocean dumping"

The viability of most sludge disposal alternatives depends on the characteristics of the sludge. Currently, the USEPA is developing technical regulations which will set forth such quality criteria for alternative methods of sludge disposal. The criteria will include specific concentration limits for designated toxic pollutants. A preliminary draft of the regulations suggest that the rate in which composted sludge or other sludge products can be applied to the land would be limited based on the concentration of certain constituents. Historical data and additional sampling was performed on the sludge from the Nassau County treatment plants in order to determine its suitability and various uses. In summary it was found that the concentrations of heavy metals, organics and nitrogen found at Nassau County are indicative-of a sludge of domestic origin. The characteristics of Nassau County sludge should not pose a major restriction upon selection of the method of sludge disposal. Based on the draft EPA regulations, however, it appears that copper concentrations may limit the land application rate for Nassau County sludge products.

In order to determine those sludge alternatives which would meet the long-term requirements for Nassau County, a study was completed by Greeley and Hansen for Nassau County in December of 1988. In a summary report of that study, the alternative screening process found four types of sludge treatment technologies which would be applicable to Nassau County as follows:

1. Co-incineration with solid waste at an existing mass burning facility.
2. Incineration at a remote site.
3. Rotary kiln drying and pelletization.
4. In-vessel composting.

All of these alternatives were compared and evaluations were made pertaining to cost and advantages and disadvantages of each technology.

On basis of unit cost, it appears that either co-incineration, pelletization or in-vessel composting could be cost effective alternatives depending on the value assigned to compost or pelletized products and the tipping fees that can be negotiated with the owner of a mass-burning resource recovery facility (see Attachment No. 8 - Table 7 from Evaluation of Long-Term Sludge Disposal Alternative Report). Marketing studies are being conducted to determine where a product can be utilized, however, at the present time similar processes are being utilized at other treatment facilities and the product is successfully being marketed. The County is interested in being able to utilize this project on Long Island and in the northeast regional area which will greatly reduce the overall cost of disposal.

Nassau County overlies a sole source aquifer for drinking water supply. Under State law, all landfills on Long Island will cease operation by December of 1990. As discussed earlier, in order to meet a December 31, 1991 deadline the only alternative for Nassau County would be to dewater sludge and landfill. Other alternatives exist such as receipt of proposals for a private venture to build facilities, however, there is not sufficient time prior to August 14, 1989 to determine what that actual alternative will be and therefore the USEPA is calling for a separate plan which would be municipally built. Again this leaves only to dewatering and landfilling of the sludge. In the same report I just discussed ultimate disposal sites were reviewed. Beginning with a list of 300 landfills in the vicinity of Nassau County (States of New York, New Jersey, Connecticut, and Pennsylvania) only 40 were identified with sufficient capacity to handle all of Nassau County's sludge grit, screening, or sludge incinerator ash. Of these 40 only 2 landfills indicated that they would consider accepting dewatered sludge from Nassau County. One of these 2 would not accept the cake solids concentration of 20%, which could be obtained from the County's existing belt filter presses at the Cedar Creek Plant and the other landfill in Pennsylvania indicated that they would not be able to handle the total quantity of sludge produced by Nassau County. This landfill is 110 miles from the County's treatment plant. Nassau County has requested of the USEPA that a list of landfills that are available for disposal of dewatered sludge be provided in order that our investigation can continue. Also, since Nassau County is finding it difficult to find a site for its 45 dry tons per day, it would seem unlikely that the region's 900 to 1000 dry tons per day would find landfills for dewatered cake from December 31, 1991 until final alternatives are developed. For Nassau County this represents approximately 30 trucks (20 cubic yards) per a day for its two major facilities. If all municipalities adopt sludge dewatering and available landfills are outside of the region all of the truck traffic will be directed to Pennsylvania and points west.

In summary, although there seems to be feasible alternatives for sludge disposal on a long-term basis, the short term or interim landfilling of dewatered sludge is much less feasible if not impractical. The dewatering of sludge and landfilling of dewatered cake represents the highest cost alternative for the disposal of sludge due to the long hauling distances involved and the cost for landfilling. It is the County's position that a viable product can be achieved by a number of processes. The available technology can be performed either by a private venture or by Nassau County, however, proper time is needed to put this technology in place. Although private ventures may be able to perform this faster than the municipalities involved, the August 14, 1989 date can not be met as the process being selected by the private venture will not be known until that time. We would be happy to provide our full report and appendices and our executive summary report on the evaluation of long-term sludge disposal alternatives if so desired.

On behalf of Nassau County I wish to thank all of the committee members to allow us to present this information today.

ATTACHMENT NO. 1

THOMAS S. GULOTTA
COUNTY EXECUTIVE

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
MINEOLA, NEW YORK 11501

January 19, 1988

Richard L. Caspe, P.E., Director
Water Management Division
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10278

RE: Revisions to an Application for a Special Permit to Dispose of Sewage Sludge at the 106-Mile Site

Dear Mr. Caspe:

We are in receipt of your letter dated November 16, 1987 regarding our Application for a Special Permit to Dispose of Sewage Sludge at the 106-Mile Site which was submitted to your office on January 15, 1987. Based upon the November 16, 1987 letter and the attached summary of application deficiencies, we would like to offer the following:

1) Enclosed is a summary of our responses to your Agency's November comments on our January 1987 submittal. Attached to the summary are revised pages of the application. Please note that these pages of the application are meant to replace those previously submitted to you last January. It should also be noted that the revisions to the January 1987 submittal are underlined.

2) Another major concern expressed by your Agency was in regard to evaluating land-based alternatives for sludge disposal. As stated in our permit application, Nassau County will be taking the following actions in regard to this matter.

A. It is our intention to place the dewatering facility located at Cedar Creek into operation by June of 1991. Modifications are needed to the dewatering facility in order to put it into operation. These modifications include an odor control system, a new polymer system and also modifications to the cake loading area. It is expected that the design of these modifications will take approximately one (1) year. The construction will take approximately one and one-half (1-1/2) years followed by three (3) to six (6) months of start-up. Therefore, within approximately three (3) years (by June 1991) Nassau County will be able to dewater Cedar Creek's sludge and no longer dispose of the sludge in the ocean. In addition, a request for proposal or contract for disposal of the dried sludge cake must be developed prior to putting this facility into operation.

B. In addition to this, Nassau County will look towards ceasing ocean dumping of sludge generated at Bay Park within seven (7) years. An evaluation of alternatives to ocean disposal of Bay Park sludge must be made. The County has authorized our consultant, Greeley and Hansen, to proceed with this evaluation. It should be noted that once an acceptable long-term land-based alternative is found, it will be necessary to design and construct the sludge facilities.

We trust that the information provided to you in this letter and its attachments is satisfactory. Please note that we are unable to fully respond to your comments on Sections 11.2, 11.4, and 11.6 regarding marine mammal populations, impacts of long lived enteroviruses and other factors at the site. Therefore, we are requesting an extension of time to submit additional information on these items. We will keep you informed of the status of our evaluation of land-based alternatives.

If you have any questions on this, please feel free to contact this office. Additionally, Deputy Commissioner John F. Caruso may be contacted at (516) 535-3911.

Very truly yours,

Ludwig C. Hasl

Ludwig C. Hasl, P.E.
Commissioner of Public Works

LCH:PMD:ck
Attach.

cc: Deputy Commissioner John F. Caruso
bcc: Mr. Francis J. Flood
Mr. Steven A. Fangmann
Mr. Gavin L. Lindner

ATTACHMENT NO. 2

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
MINEOLA, NEW YORK 11501

March 17, 1988

Richard L. Caspe, P.E., Director
Water Management Division
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

RE: Nassau County - Sludge Management
Schedule for Facilities to End
Ocean Disposal of Sludge

Dear Mr. Caspe:

As a follow-up to the meeting held in your office on Wednesday, February 24, 1988, we are transmitting to you herewith a revised tentative schedule to end ocean disposal of sludge generated at the Bay Park Sewage Treatment Plant. This schedule is also applicable to the long term disposal of sludge generated at the Cedar Creek plant. It is noted that this schedule is for long term disposal of sludge and is dependent on the evaluation of alternatives. Also enclosed is a revised schedule for the Cedar Creek sludge dewatering facility which reflects discussions in your office on February 24, 1988.

As can be seen from the schedule, we anticipate it will take approximately seven (7) years to implement a land based alternative, assuming such an alternative exists. The first three (3) years will be spent on initial activities towards implementing an alternative. As indicated, where it is appropriate, certain activities will overlap other activities. This way it is hoped that all activities can be completed by July 1995.

Lastly, it should be noted that this schedule does not include the steps which would be required for planning, design and construction of sludge dewatering facilities for the Bay Park plant. These activities would take approximately four (4) years and can be initiated at the same time as the activities for implementing an alternative. This will allow enough time so that the July 1995 date could still be met.

Richard L. Caspe, P.E., Director
Water Management Division
U.S. Environmental Protection Agency
March 17, 1988
Page 2

If you have any questions on any of the above, we would be happy to meet with you. Please feel free to contact this office at 516-535-3911.

Very truly yours,

Steven A. Fangmann, P.E.
Acting Deputy Commissioner of Public Works

SAF:PMD:pd
Encls.
cc: Commissioner Ludwig C. Hasl, P.E.
Mr. Francis J. Flood
Mr. James A. Oliva
Mr. Gavin L. Lindner

BAY PARK SLUDGE DISPOSAL FACILITIES AND CEDAR CREEK LONG TERM ALTERNATIVES

Activity	Duration Months	Start Date	Completion Date
Greeley and Hansen's evaluation of alternatives	9	Feb. '88	Nov. '88
Capital Project Request/App. for Add'l Study of Altern. (includes public part. etc.)	12	April '88	March '89
Capital Project Lifetime Budget and Bond Ordinance Req./App.	12	April '88	March '89
Review of alternatives by County DPW and presentation to County Executive/Bd. of Supervisors	6	Nov. '88	May '89
Request for Approval for Personal Services Agreement for Add'l Study	3	March '89	June '89
Public Participation Program	12	June '89	May '90
Further Evaluation of Altern. and Selection of Altern.	12	June '89	May '90
Development of EIS (SEQRA), includes approval of Bd. of Supervisors	12	May '90	April '91
2nd Capital Project Request for implementation of Alt. (may include $ for design etc)	12	April '91	March '92
2nd Capital Project Lifetime Budget and Bond Ordinance Request/Approval	12	April '91	March '92
Request for Approval for Personal Services Agree. for Design of Sludge Fac.	3	March '92	June '92
Design of Sludge Facility (other than dewatering)	12	June '92	May '93
Construction of Sludge Fac.	24	May '93	April '95
Start-up of Sludge Facility	3	April '95	July '95

MODIFICATIONS TO THE CEDAR CREEK SLUDGE DEWATERING FACILITY

Activity	Duration Months	Start Date	Completion Date
Advertisement for Bids etc.	6	Jan. '89	June '89
Construction	18	June '89	Dec. '90
Start-up of Facility	6	Jan. '91	June '91

ATTACHMENT NO. 3

COUNTY OF NASSAU

Inter-Departmental Memo

To: Commissioner Ludwig C. Hasl

From: Division of Sanitation and Water Supply

Date: August 9, 1988

Subject: Ocean Disposal of Sludge
Proposed Court Order
Discussion with Richard L. Caspe, USEPA

On August 4th, I received a call from Richard L. Caspe, USEPA, concerning a bill to ban ocean dumping of sewage sludge by 1992, which will be coming up to vote in Congress during the next month. The ocean dumping bill passed the House Public Works Committee on August 5th.

Mr. Caspe informed me that any deviation to the 1992 date would be in the form of a Court Order. Such Court Orders must be negotiated during the month of August as it is expected that by September 8th, Congress will be in the position to finalize the bill. Mr. Caspe stated that there could not be a Consent Order but only a Court Order at this point.

Mr. Caspe also informed me of the following schedule which he proposes:

	DESCRIPTION	DUE DATE
1.	Complete All Studies and EIS	12/31/89
2.	Board of Supervisors Approval	6/30/90
3.	Start Design	7/01/90
4.	Complete Design	7/01/91
5.	Advertise	11/01/91
6.	Award	3/01/92
7.	Start Construction	4/01/92
8.	Complete Construction	10/01/94
9.	Complete Shakedown	12/31/94

The aforementioned schedule differs from the one submitted by the County earlier this year. Our proposed schedule called for completion and shake down of equipment by July 1995. This schedule advances the previous one by seven months. Mr. Caspe stated that he could defend a schedule which ends on December 31, 1994. I told Mr. Caspe that the previous schedule allowed us the proper time to inform the public and to receive their approval of any alternatives to the ocean disposal of sludge. Mr. Caspe replied that he reviewed our schedule and felt that all of the necessary studies and approvals needed by the Board of Supervisors to implement the project could be completed by December 31, 1989. This schedule allows for Board of Supervisors approval to June 30, 1990, or six months to sell the alternative to the public.

I told Mr. Caspe that the schedule allows only one bid period and of our last number of major jobs, a number of them had to be rebid due to various problems. Mr. Caspe answered that there are a number of force majeure clauses which can be added to the Court Order which would allow extension of the schedule for such items. The schedule also allows for a 2-1/2 year construction period versus the 2 years proposed in our schedule.

Mr. Caspe stated that he has through the month of August to complete the Court Order negotiation. In a further conversation to me on August 5th, he said that he had met with representatives of Westchester County and that they agreed to a December 1, 1994 date. This would be one month earlier than Nassau County's date of December 31, 1994. He mentioned that I should contact Joe Lavigna of Westchester County to discuss this item.

I asked Mr. Caspe if I could receive a copy of a proposed Court Order in draft form. He replied that I would receive a copy from Paul Molinari next week and that the draft would be a copy of New York City's proposal.

The Environmental Engineering Unit is reviewing the aforementioned schedule and will review the documentation on the Court Order once it is received. A copy of this information is being forwarded to the County Attorney's office for their initial review.

It seems that the County does not have a choice in the matter of a Court Order. Only with the Court Order will we be able to dispose of sludge in the ocean beyond December 31, 1992.

As you know, a meeting was tentatively scheduled for next week when Owen Walsh returns from vacation. I understand that the meeting has just been confirmed for Monday, August 15th, at 2:30PM.

Steve A. Fangman

Steven A. Fangmann
Deputy Commissioner

SAF.ah

cc: Owen B. Walsh, First Chief Deputy County Attorney
Peter S. Williams, Second Chief Deputy County Attorney
Richard Leffer, Deputy County Attorney
James A. Oliva, Director of Environmental Operations
John J. Pascucci, Chief Sanitary Engineer
Peter Hart, Executive Assistant

ATTACHMENT NO. 4

THOMAS S. GULOTTA
COUNTY EXECUTIVE

LUDWIG C. HASL, P.E.
COMMISSIONER

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
MINEOLA, NEW YORK 11501

January 6, 1989

U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10007

Att: Mr. Richard Caspe

Re: Ocean Dumping Ban Act
Alternative Plan and Phase Out Schedule

Gentlemen:

In accordance with the above referenced act and in agreement with the schedule given to Nassau County at the meeting held in your office on December 2, 1988, we are hereby submitting our alternative plan and phase out schedule. The attached schedules detail the time frames in which we will comply with the mandates of the law. This submission will supplement our final report on the Evaluation of Long Term Sludge Disposal Alternatives developed by our consultant, Greeley and Hansen, and submitted to you by hand on December 27, 1988.

It is the intent of Nassau County to end the ocean disposal of sewage sludge by December 31, 1991. We propose to accomplish this by issuing a joint request for proposals with the County of Westchester and identifying a feasible alternative from the responses received. The first attachment reflects our proposed schedule for this activity. Meetings have been held between technical and legal personnel from both Counties, and each County Executive has issued a press release stating that an intermunicipal agreement will be developed in order to accomplish this activity.

However, Nassau County wishes to reserve its right to prolong the implementation schedule beyond December 31, 1991 should the RFP fail to yield a feasible alternative. In that event we would propose to utilize the second schedule attached which indicates implementation of a final plan by December 31, 1994. We feel that this length of time would be required to properly plan and implement a workable land-based alternative should a plan not present itself through the RFP process. We would, at that time, be willing to enter into enforcement status and pay the appropriate fees for sludge disposal as stipulated by the Act.

Our schedule also reflects the start-up of the sludge dewatering facility at the Cedar Creek Plant. Please be advised that it is our intent to dewater Cedar Creek's sludge as part of any sludge handling alternative, including the RFP with Westchester County.

I trust that this submittal fulfills our requirements as set forth in the December 2 meeting previously mentioned above. If you have any questions with respect to the above, please feel free to contact this office or Steven A. Fangmann at (516) 535-3911.

Very truly yours,

Ludwig C. Hasl, P.E.

Ludwig C. Hasl, P.E.
Commissioner of Public Works

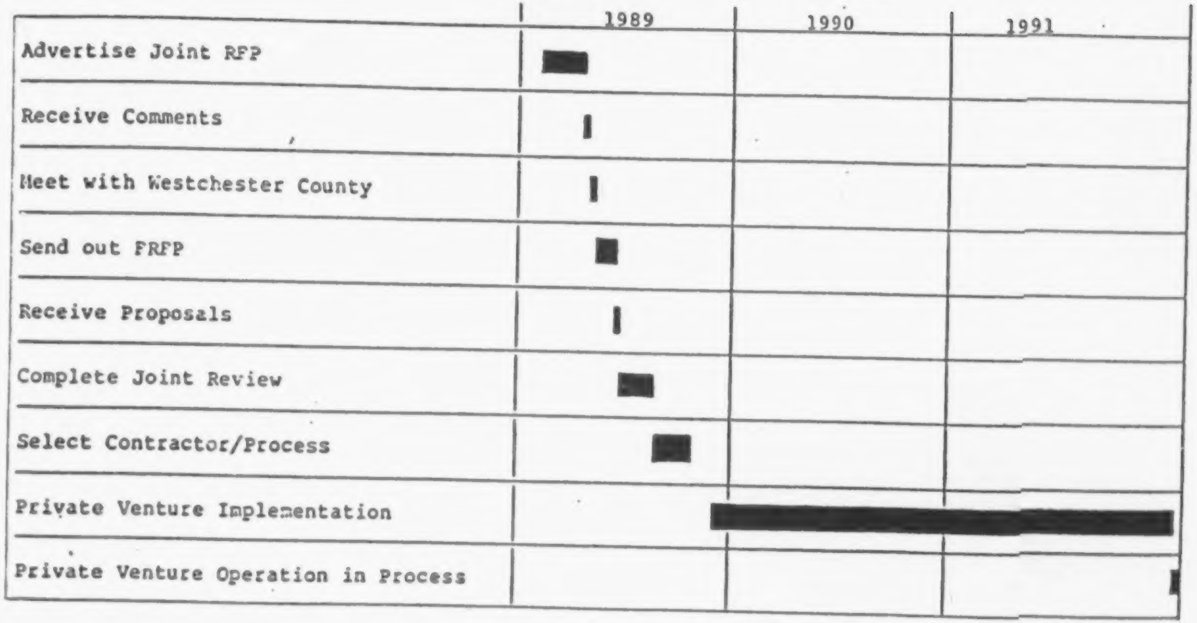
LCH:JJP:bv
Attachments

cc: Santa C. Rozzi, Deputy County Executive
Owen B. Walsh, 1st Chief Deputy County Attorney
Steven A. Fangmann, Deputy Commissioner
William Borghard, Commissioner, Westchester County
Robert Hampston, DEC
Al Machlin, DEC

bcc: James A. Oliva
John J. Pascucci
Gavin L. Lindner
Thomas A. Immerso

PRIVATE VENTURE

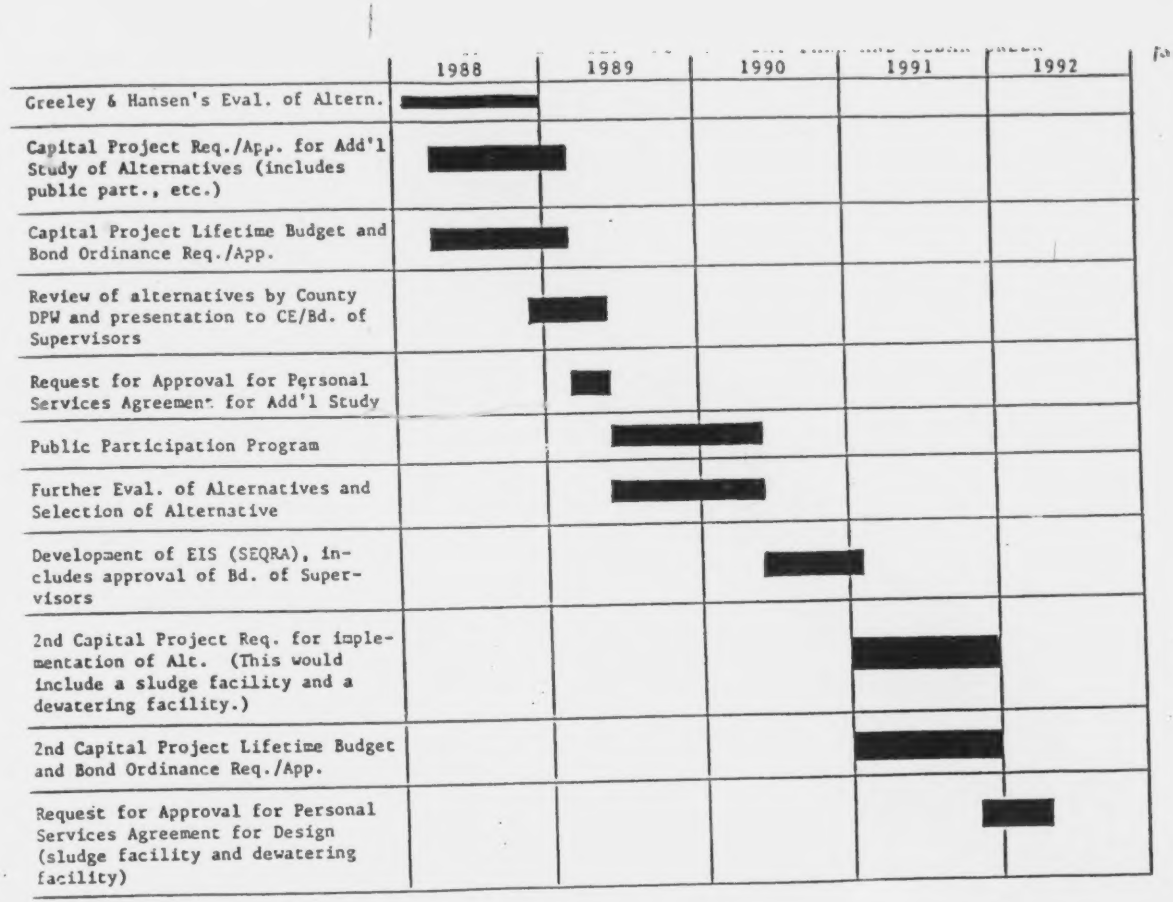
DISPOSAL RFP PROCESS WITH WESTCHESTER COUNTY



Dec. 30, 1988:NCDPW/EEU

ATTACHMENT 1

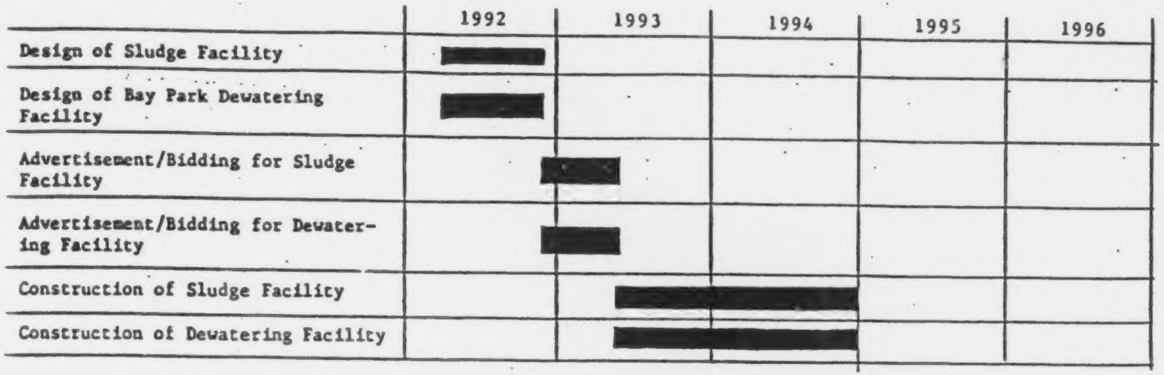
Page 1.



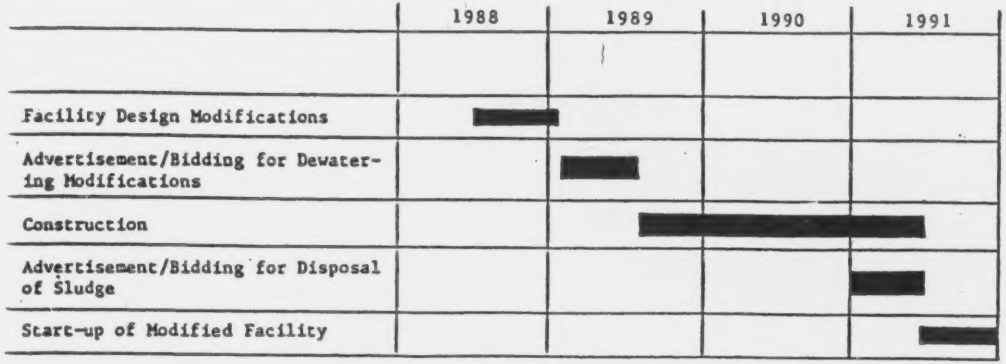
30, 1988:NCDPW/EEU

LONG TERM SLUDGE DISPOSAL ALTERNATIVES (CONT.)

Page 2.



CEDAR CREEK SLUDGE DEWATERING FACILITY



e. 30, 1988:NCDPW/EEU

ATTACHMENT NO. 5

MEETINGS HELD AT EPA FROM 10/88 - PRESENT

OCEAN DISPOSAL OF SLUDGE

DATE	TIME	SUBJECT OF DISCUSSION
11/30/88	11:00	Sludge Monitoring Program (JJP, JAO, TAI)
12/02/88	1:00	Sludge - Ocean Dumping Ban Act (SAF, JJP, JAO, JAB)
02/06/89	10:00	Schedule to Phase Out Ocean Dumping (SAF, JJP, JAO, JAB)
02/09/89	1:30	Ship Riders (JAO, RC)
02/23/89	10:40	Nassau County Schedule (SAF, JAO, JAB)
03/06/89	11:00	Draft Language Enforcement Agreement All Dumpers and Lawyers (canceled By USEPA)
03/09/89	10:30	Ocean Dumping Ban Act (canceled By USEPA
03/14/89	11:00	Draft Language Enforcement Agreement WITH NYC. (TAI, JAB AS OBSERVERS)
04/06/89	2:00	Draft Language Enforcement Agreement (canceled By USEPA)
04/11/89	10:00	Draft Language Enforcement Agreement (canceled By USEPA
04/13/89	11:00	Draft Language Enforcement Agreement (TAI, JAB)

ATTACHMENT NO. 6

THOMAS S. GULOTTA
COUNTY EXECUTIVE

LUDWIG E. HASL, P.E.
COMMISSIONER

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
MINEOLA, NEW YORK 11501

April 21, 1989

Mr. William J. Muszynski
Acting Regional Administrator
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Attention: Ocean Dumping Task Force

Re: Comments to Proposed Ocean Dumping
Permit for Nassau County

Gentlemen:

Nassau County received your draft Ocean Dumping Permit, which was transmitted by Richard Caspe's letter of March 24, 1989. Based upon our review of this document we wish to offer the following comments:

Table 1 on page 9 of the Permit lists the allowable sludge discharge rates at various vessel speeds. Nassau County is being limited to a discharge rate of 2694 gallons per minute at a vessel speed of six knots. It is our understanding based on the review of documentation presented by Battelle Ocean Sciences that this discharge rate was based on the toxicity data developed from a very limited sampling effort.

For your review and consideration, I am herein submitting copies of appropriate toxicity analyses performed on Nassau County sludge over the previous two year period (Attachment 1). These analyses were performed by New York Testing Laboratories, Inc., a New York State certified laboratory, as part of our ocean dumping contract requirements. The results of this testing are summarised in the following Table.

1987		1988	
Sample Date	LC_{50} for Mysidopsis bahia (mg/l)	Sample Date	LC_{50} for Mysidopsis bahia (mg/l)
3/26	38,000	3/23	31,500
6/26	11,750	6/10	50,000
9/28	36,000	10/14	17,500
12/23	16,000	12/16	20,500

For the purpose of our analysis, we chose to eliminate the June 10, 1988 result of 50,000 mg/l, since it appears to be inconsistent with the normal range of results that were reported. The LC$_{50}$ arithmatic mean for the seven remaining data points is 24,500 mg/l. The log transform mean is 22,500. Since this latter number represents a more conservative position, we will utilize that number, which yields a required dilution factor of 4440.

By applying this dilution factor to the nomograph on page 10 of the draft Permit (Attachment 2) for side dumping barges, the following allowable discharge rates are yielded:

Vessel Speed	Discharge Rate (gal/min)
3 knots	4,600
6 knots	9,200
9 knots	13,800

Since our analysis is based on certified data over an extended period of time, we urge you to strongly consider revising the allowable discharge rate presented in the draft Permit. Nassau County proposes an allowable discharge rate of 7200 gallons per minute at a vessel speed of six knots to be incorporated into the Permit which will become effective in August of this year. We feel that this constitutes a reasonable compromise between our data points and those developed by Battelle.

The 7200 gallon per minute discharge rate has been discussed with members of your staff and was verbally agreed to on a temporary basis for our current disposal vessel, the Seatrader I. The development of this specific rate is based on the capacity of that barge. A discharge rate of 7200 gallons per minute will permit the Seatrader I to fully discharge its sludge load in one pass over the entire dump site without having to repeat any of its track lines. This discharge rate will, therefore, also aid in the logistic management of the dump site traffic.

Again, Nassau County wishes to stress the historical consistency of this data and request strongly that USEPA consider adopting the 7200 gallons per minute discharge rate as our initial Permit number. We fully understand that the monthly data developed following the issuance of the Permit will dictate further discharge rates.

Mr. William J. Muszynski
U.S. Environmental Protection Agency
Re: Comments to Proposed Ocean Dumping
Permit for Nassau County
Page 3
April 21, 1989

If you have any questions concerning this information, you may contact this office. In addition, Deputy Commissioner Steven A. Fangmann, P.E. may be contacted at (516) 535-3911.

Very truly yours,

Ludwig C Hasl, P.E.

Ludwig C. Hasl, P.E.
Commissioner of Public Works

LCH:JJP:as
Attachments
cc: Deputy County Executive Santa C. Rossi
Deputy Commissioner Steven A. Fangmann
bcc: James A. Oliva
John J. Pascucci
Gavin L. Lindner
Owen B. Walsh, 1st Chief Deputy County Attorney

ATTACHMENT NO. 7

THOMAS S. GULOTTA
COUNTY EXECUTIVE

LUDWIG C. HASL, P.E.
COMMISSIONER

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
MINEOLA, NEW YORK 11501

April 26, 1989

Mr. William J. Muszynski
Acting Regional Administrator
U. S. E. P. A.
26 Federal Plaza
New York, NY 10278

ATT: Ocean Dumping Task Force

RE: Additional Comments to Proposed
Ocean Dumping Permit for Nassau County

Gentlemen:

Regarding the above-referenced draft Permit, Nassau County wishes to offer the following comments in addition to those previously submitted on April 21st:

- As a follow-up to the County's April 3rd letter to Mr. Richard Caspe (attached), it is our formal request that West Long Beach be included in our Ocean Dumping Permit.
- As stated previously, it is our intention to include West Long Beach in our new Ocean Disposal Contract, as well as in our long-term sludge disposal alternatives planning activities.

Should you have any questions concerning this information, please feel free to contact this office. In addition, Deputy Commissioner Steven A. Fangmann, P.E., may be contacted at (516) 535-3911.

Very truly yours,

Ludwig C. Hasl

Ludwig C. Hasl, P.E.
Commissioner of Public Works

LCH:TAI:ck
Attachment

cc: Dep. Co. Exec. Santa C. Rozzi
Dep. Comm. Steven A. Fangmann

THOMAS S. GULOTTA
COUNTY EXECUTIVE

LUDWIG G. HASL, P.E.
COMMISSIONER

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS
MINEOLA, NEW YORK 11501

April 3, 1989

Mr. Richard Caspe, Director
Water Management Division
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Re: Special Ocean Dumping Permit
106 Mile Site

Dear Mr. Caspe:

With respect to your letter of December 23, 1988 and more recent conversations which have taken place between USEPA's Regional Counsel Charles Hoffman and myself, the waste characterization data for the West Long Beach Sewer District is being hand delivered to your office on this date.

As per my conversations with Mr. Hoffman, this information should enable our application to be deemed complete, including the disposal of sludge from West Long Beach. It is our understanding that this will constitute a minor modification to our previously submitted Ocean Dumping Permit Application which has been deemed complete by your office. It is our intent to include West Long Beach in our ocean dumping contract and also in our long term alternatives planning.

Should you have any questions with respect to the above, please feel free to contact me at (516) 535-3911, or John J. Pascucci at (516) 535-4156.

Very truly yours,

Steven A. Fangmann, P.E.
Deputy Commissioner of Public Works

SAF:JJP:as
cc: Mr. Charles Hoffman, USEPA
Mr. Bruce Kiselica, USEPA
Commissioner Ludwig G. Hasl, P.E.
Mr. Fred Hirn, West Long Beach Sewer District
Mr. James A. Oliva
bcc: Mr. John J. Pascucci
Mr. Gavin L. Lindner ✓
Ms. Jo-Ann P. Brown

ATTACHMENT NO. 8

TABLE 7

COUNTY OF NASSAU
DEPARTMENT OF PUBLIC WORKS

EVALUATION OF LONG-TERM SLUDGE DISPOSAL ALTERNATIVES

Unit Cost Comparison, ($/dry ton)

Greeley and Hansen
December 1988

		Incineration		Pelletization			In-Vessel Composting			
	Coincin.	Fluid Bed	Multi-Hearth	Both Plants	Cedar Creek	Barge	Dynamic Rectangular	Dynamic Circular	Plug Flow	Land-Filling
Cedar Creek										
Dewatering	58	58	58	58	58	58	58	58	58	58
Composting	-	-	-	-	-	-	184	178	390	-
Incineration	125	416	508	-	-	-	-	-	-	-
Heat Drying	-	-	-	290	237	420	-	-	-	-
Trucking	125	125	125	-	-	40	-	-	-	220
Ultimate Disposal	-	56	56	-	-	-	-	-	-	330
Total Unit Cost per dry ton Cedar Creek Sludge	308	655	747	348	295	518	242	236	448	608
Bay Park										
Dewatering	157	157	157	157	157	-	157	157	157	157
Composting	-	-	-	-	-	-	184	178	390	-
Incineration	125	416	508	-	-	-	-	-	-	-
Heat Drying	-	-	-	292	237	860	-	-	-	-
Trucking	125	125	125	-	40	-	40	40	40	200
Ultimate Disposal	-	56	56	-	-	-	-	-	-	330
Total Unit Cost per dry ton Bay Park Sludge	407	754	846	449	434	860	381	375	587	687
Average Cost per dry ton for processing Nassau County Sludge	353	700	792	394	358	673	305	299	511	644

STATEMENT OF HARVEY W. SCHULTZ, COMMISSIONER
NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)
TO THE SUBCOMMITTEES ON
OCEANOGRAPHY AND THE GREAT LAKES,
OVERSIGHT AND INVESTIGATIONS,
AND
FISHERIES AND WILDLIFE CONSERVATION
AND THE ENVIRONMENT
ON
NEW YORK CITY'S SLUDGE DISPOSAL MANAGEMENT PLANS

Room 1334 - Longworth House Office Building
Tuesday, May 16, 1989 - 1:30 p.m.

Thank you for the opportunity to update members of the Oversight, Fisheries and Oceanography Subcommittees of the House Merchant Marine Committee on New York City's progress in investigating and implementing alternatives to ocean disposal of sewage sludge.

In April of 1988, well before Congress acted to finalize the 1991 deadline, the City began the process of searching for a consultant to assist us in developing a comprehensive sludge management program. Last November, the selected consultant, Stone and Webster, was hired to help begin our investigations into this pressing program. The $4,966,911 contract with Stone & Webster was approved unanimously by New York City's Board of Estimate on November 17, 1988; in addition, we recently returned to the Board with a $35,835,115 supplemental agreement to that contract which was approved, also unanimously, on May 4th. The supplemental agreement provides an additional $12 million for studies and data collection and $24 million for work on dewatering planning and implementation. The funding is therefore now in place for professional consultants to help us identify our best options, and Stone and Webster and their subconsultants are hard at work helping us to come as close as possible to meeting the Congressional deadline. It must be emphasized that Stone and Webster is helping the City evaluate both interim solutions and long-term alternatives for disposal of the City's sludge.

In addition, we have formed an active Citizen's Advisory Committee (CAC) to provide as much public input as possible into the choice and methodology for a new sludge disposal process or processes. CAC membership includes representation from elected officials, Community Boards, business groups, environmental groups, other governmental agencies and members of the public. There have been three meetings of the CAC thus far and one public meeting, where DEP presented its schedule and plan to find an alternative sludge management program. The CAC will be on-going as we work to arrive at solutions, and we have no doubt that it will be of great benefit. The public must be a supportive partner on working with government to identify the best alternative or alternatives to ocean disposal.

New York City also formed a dewatering task force, consisting of New York City agency experts, last September. As you may know, making decisions about this aspect of future sludge management is crucial, since virtually any sludge disposal alternatives will require dewatered sludge. Three configurations for dewatering were studied: 1) a centralized facility where all sludge is dewatered; 2) dewatering facilities at almost all of the City's fourteen water pollution control plants; and 3) dewatering at some, but not all of the City's fourteen plants. Option 3 has been selected as the one that is most practical and gives us the most flexibility. We have developed a detailed facility plan for dewatering at eight sites, and are now proceeding to order the dewatering equipment and design the facilities that will allow us to perform this function on New York City DEP property, an advantage because we can avoid time consuming land acquisition procedures and therefore expedite the dewatering part of the program.

Finally, the process to solicit sludge disposal proposals began last November with the publication eleven times in eight periodicals requesting expressions of interest from private operators for reusing or disposing of the City's sludge. The Request for Proposals (RFP) was mailed out on May 15th to 151 firms. This part of our program is being conducted to attract the widest possible range of firms, to investigate as many alternatives as possible, and to then find the best firm or firms to actually handle land based sludge disposal alternatives.

We plan to conduct the RFP process in two stages. The first stage will require evidence that the firms are financially sound and have the expertise and experience to perform the services being proposed. They will also have to describe the overall scheme and technology to be used, along with the method of ultimate reuse or final disposal. We expect to receive all responses to this first stage of our query in July, 1989. We will then evaluate these responses and develop category-specific second stage RFP's.

By October, these second stage RFP's will be sent to the qualified firms, asking them to submit detailed technical and cost proposals for the specific technology option they proposed. We will require an in-depth description of the scheme, technology and sites for performing the service, including a schedule, an operation and maintenance plan, warrantees and guarantees, and staffing and personnel to be assigned to the program. We expect to receive the second wave of responses in February 1990. If the proposals received are feasible, we will then proceed to develop an interim program that will be available for public review in July 1990.

The City has been negotiating with Federal EPA since early February on an enforcement agreement for ending ocean disposal. Thus far we have had a total of six formal face-to-face negotiating sessions. The City decided not to join our neighbors in New Jersey in sueing EPA, and is making a good faith attempt to comply with Congress' intent as well as EPA's requirements. Both we and our federal regulators have devoted extensive time and energy to these negotiations, but have not yet reached a consensus. Although we are trying to consummate an enforcement agreement, we do not yet have the details of a document worked out either to our or USEPA's satisfaction. New York City understands the consequences for not living up to a signed enforcement agreement and therefore would not sign a document knowing in advance we could not meet its conditions.

New York City will make every effort to end the ocean disposal of sewage sludge by the 1991 deadline. While we still doubt this is a realistic goal, our analysis of the proposals we receive and continuing discussions with experts may allow us to come closer to that deadline than we now envision.

We have also submitted extensive comments on EPA's Tentative Decisions on Issuing Ocean Dumping Permits, which I will be happy to share with you. We have always conducted our ocean sewage sludge disposal operations in compliance with stringent environmental criteria and in cooperation with strict monitoring procedures. Our recent comments to EPA reflect our firm belief that permit conditions must continue to be based on sound scientific methods. We are willing to continue to cooperate with EPA and other ocean scientists to insure that our ocean disposal practices continue to protect the marine environemnt until such time as land based options are implemented.

TITLE I PUBLIC LAW 100-688
THE OCEAN DUMPING BAN ACT OF 1988

TESTIMONY OF WESTCHESTER COUNTY
BEFORE THE SUBCOMMITTEES OF OVERSIGHT AND INVESTIGATION, OCEANOGRAPHY AND WILDLIFE AND FISHERIES
OF THE FULL COMMITTEE ON MERCHANT MARINE AND FISHERIES

MAY 16, 1989

ANDREW P. O'ROURKE
WESTCHESTER COUNTY EXECUTIVE
MICHAELIAN OFFICE BUILDING
148 MARTINE AVENUE
WHITE PLAINS, NEW YORK 10601

Mr. Chairman, Members of the Subcommittees, my name is Andrew P. O'Rourke. I am the County Executive of Westchester County and I would like to thank the Chairman and the Members of the Subcommittees for offering Westchester County the opportunity to present testimony on this important topic.

Initially I wish to state that Westchester County is committed to terminating ocean disposal of sewage sludge by the deadline set forth in the Ocean Dumping Ban Act of 1988 (ODBA). As my remarks will demonstrate, the County has been working diligently to take those steps necessary to meet this goal.

Since the ODBA requires that by August 14, 1989 the County must not only have a permit but also must sign either a Compliance or Enforcement Agreement with the state and federal governments, my remarks will address the status of the agreement negotiations and the status of the permit. In addition, I will outline what Westchester is doing to implement land-based sludge disposal alternatives to end ocean dumping.

I. AGREEMENT NEGOTIATIONS STATUS

On December 5, 1988, the first meeting was held with EPA after passage of the ODBA. At that meeting, EPA told the New York municipalities (Westchester, Nassau and New York City) that it would require uniform language in all the agreements, with the exception of the schedules for implementing the interim and long-term disposal plans which would be negotiated individually. EPA told the municipalities that it would produce the first draft of the non-schedule agreement language, which has been referred to throughout the negotiations as the "boilerplate". EPA said it would submit the first draft to the municipalities on January 15, 1989. The municipalities were also asked to submit their individual draft schedules for implementing their disposal alternatives to EPA. The County submitted its first schedule draft on January 6, 1989.

The first draft of EPA's "boilerplate", however, was not received until EPA called a meeting on February 10, 1989. On that date, EPA advised that unless a municipality could agree to have its final disposal alternative completed and operating by December 31, 1991, it would be required to sign an

Enforcement Agreement, even if the municipality terminated ocean dumping of its sludge by the statutory deadline using an interim land-based system. Because of EPA's position, there was much initial discussion over the interpretation of Compliance versus Enforcement Agreements as set forth in the ODBA. As Congress is aware, this dispute eventually led the six (6) New Jersey sewerage authorities to initiate litigation against EPA. Additionally, EPA stated that it would require stipulated penalties in the agreement, beyond those provided in the law, ranging from $10,000 to $50,000 per day for missing any of the agreement's many deadlines.

In the negotiations between EPA and the County, EPA first focused on obtaining the County's commitment to end its ocean dumping activities by December 31, 1991. This demand, on its face, may appear to be a simple request. EPA, however, was initially adamant that this was a precondition to negotiating any other part of the agreement. This issue, however, could not be separated from the "boilerplate" negotiations, since, for example, the language of the force majuere clause and dispute resolution procedures would be critical in determining if the municipalities were in violation of the agreement deadlines.

The process of creating schedules for interim and long-term land-based disposal has been extremely complicated. Westchester County could not just pick a solution and start construction. To do so would violate New York State's Environmental Quality Review Act (SEQRA). Failure to comply with SEQRA and other state laws could result in protracted litigation which would delay ending ocean dumping. Under SEQRA Westchester is required to thoroughly analyze and study, among other things, the various disposal alternatives, sites and potential environmental impacts before it can choose either its interim or long-term disposal options. To ensure compliance with this law, time was spent working with the State's Department of Environmental Conservation (DEC) to review the County's plans for choosing its interim and long-term disposal methods.

In addition, much of the environmental review and permitting process cannot be subject to hard and fast dates. For example, a decision on a permit adjudicatory hearing could take a few months or a year, depending on adjournment dates, the number of witnesses and the time DEC needs to review the evidence and make a final decision. Therefore, the County worked with DEC to develop best estimates of, for example, how long a particular review or hearing should usually take. This was necessary because EPA insisted that the Enforcement Agreement schedule contain specific dates for completing many of these tasks.

Also, in the County's meetings with DEC, there was some uncertainty about how specific provisions of the New York State's new Solid Waste Management Act and regulations would apply to the County's interim and long-term disposal plans. The County has been working with DEC from December of 1988 to the present to try to resolve these issues.

It is Westchester's desire to work with EPA and New York State to finalize its interim and long-term schedules within the next few weeks. A new schedule proposal was submitted by the County to EPA on April 28, 1989 and EPA has set a meeting for May 17, 1989.

Negotiations on the non-schedule language or "boilerplate" have been very difficult. Since EPA has determined that there will be uniform language in all the municipalities' agreements, individual negotiations with the various municipalities tended to be cumbersome and often counter-productive. Westchester was not only meeting with EPA, but was also meeting with New York City and Nassau County to develop a uniform proposal.

On March 3, 1989, New York City presented EPA with its own draft agreement as a counterproposal to EPA's first draft of the "boilerplate". This draft represented many of the common concerns and positions of Westchester, Nassau and New

York City. In order to establish a common position and to streamline the negotiations, New York City took the lead in the "boilerplate" negotiations. Westchester and Nassau counties have, of course, maintained continuous contact with both New York City's and EPA's attorneys during these negotiations and have offered their comments to both parties.

It was not until April 10, 1989, that EPA produced its second draft of the "boilerplate". While there were some changes consistent with the New York proposal, it was clear to all the New York municipalities involved that EPA did not agree with them on several key issues (e.g. the language of the force majuere clause, the powers of the special master, whether the decisions on the scope of work or paying over the trust fund to the state were subject to dispute resolution, how the permit would be tied into the agreement, etc.) This was of particular concern to the New York municipalities because they understood that EPA would agree to certain language changes, if the municipalities agreed to commit to the deadline for termination of ocean dumping that EPA sought. While such commitments were given, the disagreements over the particulars of the "boilerplate" were not yet resolved.

The negotiations continued and certain changes in EPA's second draft were proposed by New York City. A third draft of the "boilerplate" is expected from EPA shortly. While all parties hope that agreement will be reached soon, EPA has advised that it may not be possible to have the Enforcement Agreement in place by the Congressional deadline of August 14, 1989. This is because the Ocean Dumping Ban Act requires that there be public comment. After the draft agreement is subject to public comment, there may be changes and this will certainly take time. Then additional time will be necessary to obtain all the legally required approvals to sign the final agreement. In addition, when the final Enforcement Agreement is lodged with the federal court as a consent decree, 28 C.F.R. §50.7 will require an additional comment period of thirty days. This regulation does, however, provide for a shortening of the comment period by the Justice Department. Given the fact that there will have been prior public comment under ODBA and because of the exigency of having an agreement in place by August 14, 1989, it is hoped that the Department of Justice will permit an exception to the general rule of providing thirty (30) days for comment.

II. PERMIT STATUS

On January 15, 1987, at EPA's direction, Westchester County submitted its application for a permit to dispose sewage sludge in the ocean. In January of 1988, the County submitted supplemental information for the permit application at EPA's request. There was also much written and verbal communication between the County and EPA on various technical and legal aspects of the permit such as discharge rates, capacity, monitoring and the legal problems of cost-sharing among Westchester and the six (6) New Jersey sewerage authorities for the monitoring program. On March 24, 1989, EPA issued a draft permit. Hearings were held by EPA the week of April 24, 1989 and Westchester County submitted its comments on April 28, 1989. (A copy of the County's comments on the draft permit is annexed.)

Westchester County's comments address its concern that many of the terms in the draft permit are unreasonable and unworkable and will result in making it impossible to carry out the permit's goal - i.e. the temporary continuation of ocean dumping in a manner that is safe and protects the environment. The County's chief concern is that EPA's proposed permit terms could result in a lack of sufficient barge capacity for Westchester and the six (6) New Jersey sewerage authorities which presently share the same sludge transporter, 106 Mile Transport Associates (106 Mile).

Specifically, 106 Mile has advised all its clients and EPA that the impact of EPA's proposed discharge rates, which are substantially lower than the old rates, will result in there being insufficient capacity to meet the combined disposal needs of Westchester and the six (6) New Jersey authorities. This is because the lower rates will cause the barges to remain at the dump site for substantially longer periods of time so that there will not be enough barges to pick up the combined sludge output at the various treatment plants. The draft permit provisions regulating sludge mixing and vessel scheduling will also act to further reduce capacity.

Since ODBA will soon end the sludge hauling business, it is unreasonable to assume that any company will invest the capital necessary to bring new barges on line. Also, there are very few companies that have these specialized barges and the only companies that will be able to provide this service will be limited to those listed on the permit issued by EPA.

If 106 Mile's estimates prove true and there are not enough barges to dispose of Westchester's and the six (6) New

Jersey authorities' sludge, the result will be an environmental crisis at the treatment plant sites. Once storage capacity at a plant is exceeded, there will be no alternative but to either limit plant operations and discharge partially treated sewage or to dispose the sludge directly into the local environment. These are the only options until interim land-based disposal systems are in place.

Westchester hopes that EPA will consider this issue and the other practical and technical problems that Westchester's comments on the draft permit have raised when EPA makes its final decision on the permit. The County is concerned, however, that it may not be possible to resolve all these permit issues under the time frames provided in EPA's own regulations by the August 14, 1989 deadline set in the ODBA.

III. STATUS OF WESTCHESTER COUNTY'S EFFORT TOWARD INTERIM AND LONG-TERM LAND-BASED SLUDGE DISPOSAL

Westchester County is committed to meeting the deadline set by Congress for terminating its disposal of sewage sludge in the ocean. In order to do this the County has developed a two track plan that will utilize a temporary interim method to achieve the timely end of ocean dumping by December 31, 1989 and a separate long-term plan to implement a permanent disposal method. An interim method is necessary because a current evaluation of existing limited disposal options has led to the conclusion that a permanent environmentally sound land-based disposal facility cannot be in place by the deadline.

To develop these plans, the County is also taking a two track approach. Both Westchester and Nassau counties entered into an Intermunicipal Agreement to produce a request for proposals (RFP) for private solutions to the counties' interim and long-term disposal needs. A consultant was also hired by Westchester and is now working to help develop plans for a public long-term disposal facility, in the event that the RFP process does not produce an acceptable and environmentally sound private proposal.

Pursuant to Section 120W of the New York State General Municipal Law, a draft RFP was released for sixty (60) days of public comment on March 10, 1989. The comment period closed on May 10th. The comments are now being reviewed and a final RFP will be published by June 15, 1989. All of the private proposals should be received by August 15, 1989. The proposals will then be reviewed and, if required by law, a public hearing will be held.

It is anticipated that the private proposals for long-term solutions together with the results of the consultant's study of possible public alternatives will be evaluated in the form of a Generic Environmental Impact Statement pursuant to New York State's SEQRA law. In addition, the County plans to submit its alternatives study to New York DEC for conceptual review. When both processes are completed, a choice for the permanent long-term alternative will be made and then the lengthy state permitting process for the construction of a specific facility will commence.

The choice of an interim solution will be limited to private proposals that result from the RFP process. Based on current evaluations, the County could not build and permit an interim disposal facility and still meet the statutory deadline.

If the RFP process does not produce any interim alternatives, it appears that a private landfill may be the only temporary option until the permanent disposal method is in place. The choice of the interim disposal option should be completed by the end of this year.

Finally, the County has already begun work with its consultant on the environmental studies necessary to fully comply with SEQRA and other environmental laws. This will ensure compliance with the deadline set by Congress for terminating ocean dumping by December 31, 1991.

Mr. Chairman and Members of the Subcommittees this concludes my remarks. Thank you again for the opportunity to submit this testimony to you.

(Additional material was submitted for the record and placed in the files of the Subcommittee.)

TESTIMONY ON BEHALF OF THE
NATURAL RESOURCES DEFENSE COUNCIL, INC.,
AT A JOINT HEARING
BEFORE THE
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS,
THE SUBCOMMITTEE ON OCEANOGRAPHY AND GREAT LAKES,
AND THE SUBCOMMITTEE ON FISHERIES
AND WILDLIFE CONSERVATION AND THE ENVIRONMENT
OF THE
MERCHANT MARINE & FISHERIES COMMITTEE,
U.S. HOUSE OF REPRESENTATIVES

May 17, 1989

Prepared by: Lynne T. Edgerton, Esq.
Jessica C. Landman, Esq.

Mr. Chairman, my name is Lynne Edgerton. I am a senior attorney in the Coastal Project of the Natural Resources Defense Council (NRDC) in New York City. On behalf of NRDC's trustees, members and staff, I thank you for the opportunity to testify today.

Introduction

The Natural Resources Defense Council, Inc. is a national organization with over 83,000 members. NRDC is dedicated to protecting public health and the environment against pollution, and to preserving natural resources for current and future generations. NRDC considers the expeditious phase-out of ocean dumping an important step toward securing a clean and productive marine environment and has actively supported the Ocean Dumping Ban Act of 1988.[1] In addition, NRDC has had a long-standing interest in the beneficial reuse and safe disposal of sewage sludge on land,[2] and in air quality in the New York City-New Jersey metropolitan area.[3]

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[1] See Edgerton & Landman, "Steps Toward Solving New York City's Ocean Disposal Problems," Testimony on behalf of NRDC before the Subcommittee on Water Resources of the Committee on Public Works and Transportation of the U.S. House of Representatives (August 2, 1988). See also, Statement of Clifton Curtis of the Oceanic Society on behalf of NRDC and other organizations before the Senate Committee on Environment and Public Works (February 18, 1988); Letters from Lynne Edgerton to Christopher Daggett, EPA Region II Administrator, and Richard Caspe, EPA Region II Water Quality Division Director, May 16, 1988 and June 29, 1988.

During the last year, NRDC has taken an active part in the consideration of three aspects of sewage sludge: 1) the implementation of the Ocean Dumping Ban Act of 1988, including EPA's tentative decision to grant special ocean dumping permits to the nine New York and New Jersey municipalities currently dumping sewage at the 106-mile site;[4] 2) EPA's regulations pursuant to the Clean Water Act governing sludge management, use and disposal; and 3) New York City's pretreatment program and

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[2] For example, NRDC has filed suit against the United States Environmental Protection Agency over the EPA's failure to issue regulations governing the management and safe disposal of sewage sludge. Natural Resources Defense Council, Inc. et al. v. Reilly, Civ. No. 88-2101 (E.D. Pa.). In addition, by letter of July 20, 1988, NRDC has asked EPA to classify publicly-owned treatment works (POTWs) that ocean dump sewage sludge as priority POTWs for sludge permitting purposes as part of EPA's Interim Implementation Strategy under the Clean Water Act. See also, Comments of NRDC before the New York Department of Environmental Conservation on the draft State Pollutant Discharge Elimination System (SPDES) permits for the 14 municipal treatment facilities in New York City (June 29, 1988).

[3] See E. Goldstein, R. Ayres & M. Izeman, Statement of the NRDC before the Subcommittee on Health and the Environment of the Committee on Energy and Commerce, U.S. House of Representatives, concerning Clean Air Act amendments to reduce ozone and carbon monoxide pollution (August 3, 1987). Also, for the past several years, NRDC has opposed the Brooklyn Navy Yard incineration project in lengthy administrative proceedings because of serious deficiencies in the project's proposed permits relating to air quality and solid waste. Specifically, NRDC has objected to the following provisions of the proposed New York State permit as inadequate: emissions standards; emissions offsets; operating requirements; operator training and certification; monitoring and enforcement; ash handling; and recycling. See Statement of NRDC in Support of Its Application for Party Status, In the Matter of the Application of Signal Environmental Systems, Inc. for permits to construct and operate the proposed Brooklyn Navy Yard Resource Recovery Facility in Brooklyn, New York, DEC Project No. 20-85-0306 (April 27, 1987).

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[4] See Joint Comments of the Oceanic Society and NRDC in Response to the Environmental Protection Agency's Proposed Sewage Sludge Permits (April 27, 1989); Comments of Lynne Edgerton on behalf of the NRDC and Oceanic Society at a Public Hearing before the EPA Region II (April 26, 1989); Statement of Lynne Edgerton on behalf of the NRDC and the Oceanic Society at a Public Hearing before the EPA, Region II (February 17, 1988).

NPDES permit applications.[5] An NRDC review and analysis of EPA's proposed sludge regulations for land-based alternatives is underway.

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[5] NRDC, the Hudson River Fisherman's Association and the Interstate Sanitation Commission recently prevailed in state court litigation challenging the New York State Department of Environmental Conservation's (DEC) issuance of State Pollutant Discharge Elimination System (SPDES) permits for New York City's fourteen municipal sewage treatment plants without holding a public hearing. The plaintiffs had challenged numerous inadequacies in the permits, including lack of specific requirements for the pretreatment of sewage, lack of limits on individual toxic pollutants and whole effluent toxicity, and the failure to incorporate mandatory ISC Water Quality Regulations. Interstate Sanitation Commission et al. v. Jorling et al., Index No. 16492/88 (April 17, 1989) (J. Dunkin).

In dicta, the court noted the admitted environmental harm caused by the plants:

> The DEC acknowledges that these treatment plants are a major source of pollution to our waters and pose a threat to marine life. Five of the plants provide no secondary treatment of sewage and there are instances of untreated discharges of raw sewage. There is also leakage from the City's combined sewer systems, problems caused by combined sewer overflows (hereinafter "CSO's") in wet weather, toxic substance discharges, beach washups of waste and other materials, frequent pump station failures, unacceptably high flows coming into the treatment plants, odors associated with waste treatment operation, and inadequacies in the operation and maintenance of the plants. Slip Op at 3.

At NRDC's specific request, the SPDES permits were not voided pending the administrative hearing.

The principal focus of this hearing is whether the implementation of the Ocean Dumping Ban Act of 1988 is proceeding in accord with Congressional intent.[6]

Although NRDC has been involved in all phases of the Ban Act's implementation, NRDC was invited to speak today to the most difficult and far-reaching question raised in this two-day hearing: What is an environmentally acceptable, economically feasible way to dispose of the New York City-New Jersey metropolitan area's sludge?

There is, of course, neither an easy answer, nor a single answer. If there were, we would not be here today.

On the other hand, there are constructive steps that can be taken toward solving the region's enormous sludge problem. Indeed, Congress' enactment of both the Ocean Dumping Ban Act of 1988 and the Clean Water Act Amendments of 1987 governing sludge management on land were big steps in that direction. Also, more recently EPA Region II, New York and New Jersey together have initiated a process for conducting a regional study of whether new sludge incinerators would further degrade the area's air quality. Such a study is a positive step toward insuring that today's ocean pollution does not become tomorrow's air pollution.

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[6] NRDC, together with the Oceanic Society, has submitted a separate written statement on NRDC's numerous concerns about other aspects of the implementation of the Ocean Dumping Ban Act to this Committee. See "Statement of Sally Ann Lentz on Behalf of the Oceanic Society and the Natural Resources Defense Council," May 17, 1989.

Indeed, today's hearing on innovative land-based technologies will itself advance the search for appropriate sewage sludge use and disposal methods. Promising technologies which do not result in cross-media transfer of pollutants will, we hope, be identified.

I. Land-Based Alternatives and Innovative Technologies

As all participants in the implementation of the Ocean Dumping Ban Act doubtless agree, it is critical that the phase-out of ocean dumping not result in further contamination of the air through large-scale incineration, or further contamination of groundwater or soil through landfilling or land application. Innovative technologies may hold out promise for avoiding these cross-media transfers.

I would like to be able to come before you to announce that we have done a full analysis of all the emerging technologies for handling sewage sludge in the New York City-New Jersey region and have concluded that there is one clear winner. Unfortunately, I cannot. We simply do not have the resources to conduct such an in-depth analysis. What is particularly unfortunate, however, is that nobody else has done it either. Neither EPA nor the municipalities which are currently ocean dumping has undertaken such an analysis.

And yet, finding the best long-term solution for sewage disposal and use is critical for our environment. If we have one suggestion to these subcommittees, it is that government needs to insure that the analysis is done right away so that large investments are not made in unworkable, environmentally unsound technologies.

The EPA should undertake an independent analysis of the problems confronting, and the resources available to, the various dumping authorities. In particular, the EPA should seek to determine what alternative sludge disposal options are environmentally desirable, legally sufficient, and practical for each authority, as well as how soon these options can be implemented. Special attention should be given to innovative technologies which hold the promise of beneficial use, safe disposal and commercial viability.

Such an analysis is mandatory because the Ocean Dumping Ban Act requires that compliance and enforcement agreements contain schedules that, *as determined by the Administrator*, specify reasonable dates for implementation of alternative disposal methods.[7] Furthermore, the EPA agreements must end the ocean dumping of sewage sludge "at the earliest possible time."[8] Obviously, the EPA cannot determine what dates are reasonable or possible without undertaking some independent analysis of the situations confronting the various dumping authorities.

The EPA should encourage the dumpers to devote some portion of their alternate plan to demonstration projects using natural systems, especially those dumpers who contemplate entering into enforcement agreements because they are still in the process of identifying, evaluating and selecting interim and long-term sludge disposal or use plans.

NRDC has suggested to the EPA Region II Administrator that the agency initiate a roundtable discussion of the feasibility of using innovative technologies and natural waste management systems such as thermal conversion of sludge to fuel oil, metals mining sludge, and deep well vertical reaction vessel oxidation. This is particularly important with regard to New York City which, because of the large volume of sludge it produces, could serve as a vanguard for sludge disposal alternatives for nationwide application. Convening a conference on sludge use and disposal options (and sludge elimination options), at which the dumping authorities could interact with commercial concerns, scientists, engineers, environmentalists and sewage authorities from across the nation, would enable the dumpers to investigate creative solutions to the sludge use/disposal dilemma.

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[7] H. Conf. Rep. No. 1090, 100th Cong., 2d Sess. (Conference Report) 29; see ODBA § 104B(c)(2)(B)(i), (3)(B)(i), (4).

[8] 134 Cong. Rec. S16686 (daily ed. Oct. 18, 1988) (statement of Sen. Lautenberg).

This roundtable conference should occur as soon as possible. If convened in a timely manner, such a roundtable would help to avoid the premature dismissal of potentially valuable sludge disposal systems. Particular attention should be given to identifying professional, bureaucratic, and political obstacles that prevent the implementation of emerging technologies. Efforts should be made to facilitate demonstration projects of particularly promising options. Clearly, each dumping authority faces unique challenges which may make some alternatives more suitable than others; for example, land application to forests may be practical in New Jersey, but impractical in New York City. However, beneficial reuse should be stressed to the greatest extent possible in all cases.

The EPA should insure that alternative plans give full consideration to emerging technologies for wastewater management and sewage sludge use and disposal, including the use of natural systems for waste management and treatment. The NRDC believes that these hearings will help insure that attention is given to the development of these systems, which often cost far less than high-technology solutions (such as incinerators), and which hold great promise for producing, in some cases, energy or other useful products such as fertilizers and soil conditioners.

Congress should consider initiation of a study to report on these technologies and to recommend ways to insure their access to the market. Again, special concern should be given to identifying political and bureaucratic obstacles to the development of improved solutions to sewage sludge management.

II. Regulation of Sludge Disposal on Land: The Transition

Any discussion of land-based alternatives must include a look at the current status of the federal sludge regulations that are supposed to insure that land-based alternatives are safe.

Unfortunately, the news on that front it not good. To date, EPA has not promulgated the national sludge quality regulations required by the Clean Water Act.

But the absence of these national regulations is not an excuse for inaction in ending ocean dumping. EPA can and must complete the task of issuing the national sludge quality regulations; but in the meantime, EPA also can and must take interim steps to enable the ocean dumping municipalities to implement safe land-based alternative use and disposal options. The Clean Water Act expressly provides for such interim EPA action.

A. Current Status of the National Sludge Quality Regulations

Since 1977 EPA has been subject to the Clean Water Act's mandate that it establish national regulations to protect human health and the environment against toxic contaminants in sludge. But between 1977 and 1987 EPA failed to issue these regulations.

In the face of this decade of inactivity, Congress in 1987 amended the Clean Water Act. Without excusing EPA's lack of progress, the 1987 amendments established a new series of deadlines for agency rulemaking action. The amendments specified that a first round of sludge regulations was due in August 1987, based on information available to EPA at the time the amendments were enacted. A second round of regulations was due on June 15, 1988, based on new information to be collected by EPA.

Despite these new deadlines, EPA has continued to delay. NRDC sued EPA in March 1988 because no rules had been proposed, much less promulgated.[9] Today, EPA at last has published *proposed* rules, but no final rules. The agency has claimed that it needs over two-and-one-half years, until October 1991, to promulgate the final rules. We believe that this amount of delay is both illegal and unnecessary.

In addition to this unconscionable delay, EPA also has taken an approach in its proposed rules that does not satisfy the Clean Water Act. The proposed rules as presently drafted create a major loophole. While they *do* follow the law in proposing numerical concentration limits for toxic contaminants in sludge that is incinerated, land applied, mono-filled and distributed or marketed,[10] they do *not* propose any such limits for sludge that is placed in municipal landfills ("Subtitle D" landfills, under the Resource Conservation and Recovery Act) along with other solid waste. The result of this loophole is that many municipalities may seek to move their contaminated sludge into the ever-shrinking municipal landfill space, rather than clean it up and use it productively as fertilizer or compost.[11]

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[9] *NRDC v. Reilly*, No. 88-2101 (E.D. Pa., filed March 6, 1988). No decision has been reached on NRDC's motion for summary judgment, argued in January of this year.

[10] EPA at one time had planned to issue national regulations for ocean dumped sewage sludge. However, since the enactment of the Ocean Dumping Ban Act the agency has decided not to promulgate those regulations after all. Instead, EPA will rely upon the MPRSA permits as the vehicle for regulating ocean-dumped sludge during the interim before the phase-out is complete. NRDC has not objected to this approach, *provided that* EPA fulfills all of its Clean Water Act responsibilities in the process.

In sum, we have seen slow and unsteady progress towards national sludge quality regulations, with much delay already behind us and the threat of significant additional delay ahead. We continue to have a national regulatory vacuum for land-based sludge disposal.

B. Interim Environmental Protection Strategies

The regulatory vacuum is bad news. However, we need not simply postpone action until that vacuum is filled. EPA has the legal authority and the duty to take interim steps to protect public health and the environment against any hazards from sludge use or disposal, even before the national sludge regulations are promulgated. It is pursuant to that authority that EPA can and must regulate land-based alternatives to ocean dumping today. In other words, the national regulatory vacuum need not interfere with finding and implementing localized solutions to the ocean dumping problem.

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[11] NRDC has numerous other concerns about the proposed regulations, but it is premature to discuss those reservations at present; the public comment period for the proposed rules ends in August, and NRDC will submit its comments to EPA in the next few months.

Section 405(d)(4) of the Clean Water Act provides that

> Prior to the promulgation of the [national sewage sludge regulations], the Administrator shall impose conditions in permits issued to publicly owned treatment works under section 402 of [the Clean Water Act] or take such other measures as the Administrator deems appropriate to protect public health and the environment from any adverse effects which may occur from toxic pollutants in sewage sludge.

The section 402 permit referred to in this provision is the National Pollutant Discharge Elimination System or "NPDES" permit, issued to each sewage treatment plant that discharges wastewater to waters of the United States.

Congress envisioned that the NPDES permits of sewage treatment plants would be revised to include whatever regulatory requirements were deemed necessary to protect the public against any adverse effects of toxics in sludge, during the interim before final regulations are written. Moreover, Congress envisioned that, when the national technical regulations ultimately were completed, the NPDES permit also would be the primary vehicle for implementing those national regulations for such plants.[12]

In sum, in the near term EPA has the authority and the duty to use the NPDES permits of sewage treatment plants to implement sludge quality controls, or to take whatever other steps are necessary to protect human health and the environment from toxics in sludge.

To carry out this interim duty EPA has issued a document called "Strategy for Interim Implementation of Sludge Requirements in Permits Issued to POTWs." The Interim Strategy and accompanying guidance tells EPA Regional and State officials to place in the NPDES permits of POTWs both sludge monitoring requirements and, where appropriate, numerical limits on toxics in sludge, to protect health and the environment in the short term. (It is worth noting that EPA singled out POTWs that incinerate their sludge as "priority facilities" for interim permitting purposes, because of concern that sludge incinerators were more likely than other disposal options to pose a potential threat to health and environment.[13])

---

[12] The Clean Water Act contemplates that the NPDES permit will be the primary vehicle for imposing the national sludge quality regulations on sewage treatment plants. Section 405(f) provides that

> Any permit issued under section 402 ... to a publicly owned treatment works ... shall include requirements for the use and disposal of sludge that implement the regulations established [under this section of the Clean Water Act] unless such requirements have been included in a permit issued under the appropriate provisions of [RCRA, the Safe Drinking Water Act, the MPRSA, or the Clean Air Act], or under State permit programs approved by the Administrator....

Each of the sewage treatment plants affected by the Ocean Dumping Ban Act has an NPDES permit; each of these permits can and should be the vehicle for imposing whatever sludge quality requirements -- that is, limits on the levels of the toxics present in sludge -- are necessary to safely implement land-based alternatives to ocean dumping.

The question remains what those sludge quality limits should be. EPA's Interim Strategy suggests to EPA and State permit writers[14] that they look to existing State sludge quality requirements for guidance on setting interim sludge quality limits. However, EPA is not supposed to stop there; if more stringent limits are necessary to protect sludge quality and make land-based disposal

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13. See "Attachment 1, Permitting Priorities and Basic Sludge Permit Requirements to Implement Section 405(d)," accompanying the EPA Interim Strategy, at 1.

14. In both New York and New Jersey the State has been delegated the authority to manage its own NPDES permitting program. The EPA's Interim Strategy contemplates that the State will make the necessary changes to the POTW's NPDES permit; if the State refuses to do so, then EPA will issue an NPDES "permit rider" containing the necessary sludge quality limits.

or use options safe, then the permit writer must include the necessary controls in the NPDES permit.

New York and New Jersey both do have some State regulations pertaining to land-based sludge disposal and use. The EPA Interim Strategy provides a summary matrix of those and other existing State regulations.

However, existing State regulations may not, in and of themselves, provide adequate protection for the public. One of EPA's most important short term responsibilities is to (1) determine what sludge quality limits are appropriate for the land-based alternatives (ranging from composting to incineration) being proposed by the ocean-dumping plants, and (2) implement those limits through the NPDES permits of the affected facilities, or through some other means insure that health and the environment are protected. The interim sludge quality limits should be such that, on the day that any ocean-dumping facility ceases to place its sludge in the ocean and switches to a land-based disposal or use option, the sludge meets the quality requirements of that land-based option. This may mean a series of increasingly stringent quality limits, phased in over time.

In addition to protecting the public on land, EPA's duty to take interim environmental protection action under the Clean Water Act also extends to the near-term protection of the ocean environment. We submit that the environmental effects on the ocean that are exacerbated by the poor quality of the ocean-dumped sludge also should be addressed under EPA's Interim Strategy. EPA should implement sludge quality controls through the NPDES permits of the ocean-dumping facilities, as a part of its overall strategy for ending ocean dumping as swiftly as possible and ameliorating the environmental impact on the ocean in the meantime.[15]

The NPDES permit is an ideal vehicle for interim as well as long term sludge quality limits, whether directed at protecting the ocean or facilitating land-based alternatives, because it also is the vehicle for imposing the controls on toxic discharges from industry that will in fact improve sludge quality -- that is, the pretreatment requirements that Congress recognized as essential to the phase-out of ocean dumping when it enacted the ODBA.[16]

---

[15] NRDC and the Oceanic Society suggested this principle to EPA by letter dated July 20, 1988. To date we have received no response to our suggestion.

[16] Section 104B(e)(2)(B)(ii) provides specifically for improvements in pretreatment techniques to facilitate the implementation of land-based disposal alternatives.

Conclusion

When it passed the Ocean Dumping Ban Act of 1988, Congress was well aware that the task before the nation is three-fold: first, to stop polluting our precious ocean waters with contaminated sludge; second, to reduce and eventually eliminate the contaminants from sludge; and third, to establish a land-based sludge management system which encourages beneficial use and safe disposal of sludge.

NRDC is committed to the achievement of all three goals, and believes that innovative technologies which hold the promise for long-term beneficial use of sewage sludge should receive especially careful consideration.

KUBOTA AMERICA CORPORATION
THE CHRYSLER BUILDING
405 LEXINGTON AVENUE NEW YORK, N.Y. 10174 PHONE (212) 490-8050

MAY 17, 1989

U.S. HOUSE OF REPRESENTATIVES

JOINT COMMITTEE HEARING ON
TITLE I OF PUBLIC HEALTH LAW 100-688

SUBCOMMITTEE ON OCEANOGRAPHY AND THE GREAT LAKES
SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION
AND THE ENVIRONMENT
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

TESTIMONY GIVEN BY: MR. DAVID GREENHUT, P.E.
DIRECTOR OF MARKETING AND
NEW PRODUCT DEVELOPMENT
KUBOTA AMERICA CORPORATION

I would like to thank the Subcommittees on Oceanography, Oversight and Investigations, and Fisheries and Wildlife Conservation for inviting me to present an alternative technology for the disposal of sewage sludge. I am a Director of Kubota America Corporation, which is a wholly-owned subsidiary of Kubota, Ltd. with headquarters in Osaka, Japan. Our research group in Japan were pioneers in developing the technology of sludge vitrification which is now accepted by the Japanese Sewage Agency as a viable alternative to existing sludge management practices. This technology and associated equipment has been transfered to Kubota America Corporation which is now making it available for use throughout the United States.

The concept of sludge vitrification is to perceive sewage as a base material for the production of an amorphous glass-like silicate aggregate which in turn is used in the production of ceramic tiles, cinder blocks, ground cover, drainage fill, and in asphaltic and cement mixes. The Kubota Melting furnace has been designed to produce this aggregate material in a consistent and pure form regardless of the variation of sludge composition. The aggregate, although it contains the normal metals found in typical sewage sludge, is non-leeching and inert. This allows this material to be used on a stand-alone basis without the need for any encapsulation or further processing.

The Japanese Ministry of Construction and Tokyo Metropolitan Government have approved the material for use as a substitute for landfill sand, improving agent for poor drainage land, anti-water penetrant agent for tennis courts and playgrounds, pavement material for light-loaded roads, and a bedding for pipes. Here in the U.S. the New Jersey Department of Transportation has conducted chemical tests and has found the material chemically stable. We are currently undertaking physical testing to determine how to best incorporate this material into the existing state regulations.

To fully understand what is meant by vitrification it is important to understand the nature of sludge and the Kubota Melting Furnace. Sludge is basically composed of three materials: water, organics (hydrocarbons) and inorganics (minerals, metals, etc.) The first step in processing the sludge is to remove the water by mechanical means. This can be done with existing dewatering machines such as belt presses, centrifuges, and plate and frames. Since mechanical dewatering is the most economical way to process the water, the dryer the cake produced, the more economically the remaining material can be processed. After mechanical dewatering, the sludge cake is then dried using an indirect dryer to remove the remaining water until the cake contains only 20% moisture and proceeds to the melting furnace. The furnace, which operates at 2500°F, causes the organic material to break down and gasify by pyrolysis. At this temperature no organic material can survive and the organics will be disassociated into its elemental form, whereupon it combines with oxygen giving off heat. This heat maintains the primary chamber at the high temperature and causes the remaining inorganic material to form a liquid.

Figure #1 represents the structure of the Kubota Melting Furnace. As illustrated, the primary combustion chamber consists of a double cylindrical structure. The dried sludge is fed into the annular chamber between the inner and outer cylinders. The outside cylinder and the furnace bed are of common construction, and rotate slowly at 1 to 4 revolutions per hour. Even though there is only one feeder inlet, the height of the materials fed into the annular chamber is evenly maintained over the entire circumference as a result of the rotation. With the burner unit remaining stationary, the materials to be melted are fed continuously by gravity. The material fed into the annular chamber falls towards the reaction zone as melting takes place. Note that the primary combustion chamber is very compact and conducive to high efficiency melting.

The dried material is completely reacted and liquified at temperatures of 2400 to 2600°F. If the heating value of the sludge material exceeds 6,500 btu/lb self-burning and melting will take place without the need for additional fuel. The liquified inorganics, together with the combustion gas, flows down the slag port and into the secondary reaction chamber. The combustion gas is completely reacted inside the secondary chamber and exhausted to heat recovery and gas cleaning equipment. The liquid inorganics are quenched in a water tank where the solidification forms an amorphous silicate structure which compounds with the metal which may be present.

Sludge volume reduction is maximized since any organic material in the sludge is completely reacted and the inorganics converted into a densified slag. For a typical sludge cake at 80% moisture, approximately fifty (50) tons will transform into one and one half (1-1/2) yards of slag.

Minimum exhaust gases are generated since excess air is maintained to a minimum thereby allowing the waste gas treatment equipment to remain small. Operating and maintenance cost savings will accrue as a result of autogenous operation coupled with the efficient recovery of the waste heat and secondary fuel sources, if required.

The Kubota Melting Furnace has been under development commercially since 1976. The Japanese Sewage Agency operated by themselves a pilot plant for three years between 1979 and 1982 in order to study vitrification. After their review and publication of their data in 1983 they have accepted and promoted the use of vitrification for the processing of sewage sludge. Although vitrification uses high heat and combustion during processing, it should not be confused with incineration.

In the past incineration has been used to reduce the volume of municipal refuse and sewage sludge. The concept was to reduce the volume and thereby reduce the need for ultimate disposal. Recently, in more modern resource recovery plants, more consideration has been given to controlling combustion and making use of the heat. But still the final problem of ultimate disposal of the ash remained. The Kubota melting system is designed to achieve ultimate disposal of the sewage sludge and is not an intermediate step.

Technically, incineration and vitrification are not the same and have very distinct differences. As an example: incineration's main purpose is to reduce volume and combust to an ash, whereas with vitrification there is no ash.

Incineration is basically the reduction of matter through oxidation whereas vitrification involves more complex silicate chemistry as well as oxidation. In fact, sewage sludge need not be vitrified directly and can be incinerated to form an ash before it is vitrified. This has been done in plants we have built to vitrify ash from municipal solid waste incinerators which is another waste stream which is now coming under scrutiny in the United States.

We have developed this system to be able to recycle the sludge cake without worrying how much of any particular element it contains. Once the vitrified slag is produced, it is safe and inert without concern for the sludge quality used to produce it. This system has been reviewed by the New York State Department of Environmental Conservation, Bureau of Waste Reduction and Recycling, and they have found "The Kubota system would be included within the category of recycling and/or reuse of waste." The vitrified material would also lend itself to reuse within the community, in which it was generated. This would give the community or plant operator the ability to control the process from beginning to end without worry about interstate legislation and its effect on the distribution of their final product.

On February 6, 1989, the Environmental Protection Agency issued a Proposed Standard for the Disposal of Sewage Sludge, 40 CFR, parts 257 and 503. A portion of these standards deal with the air emmissions requirement for sludge incineration. These standards were not intended for vitrification, however they do address the quality of emmission that should be achieved by a sludge disposal system. We have reviewed these standards and I can state that the plant we are currently building in Monticello, New York will exceed these standards. I wish to point out that our plant was designed and an application for construction was sent to the NY DEC in January, 1988, a full year before the proposed regulations were issued for review. However, the overwhelming majority of existing sludge incinerators will not be able to meet these requirements without major modifications.

The vitrification technology, although capital equipment intensive, is comparable in overall cost to other sludge disposal systems, when you consider that the other systems will have to be improved to meet the new proposed guidelines. For a 100 tons of cake at 80% moisture per day system, we project operating and maintainance costs to be $35 per ton. Amortization costs for the plant can double this figure depending upon interest rates and tax treatment. These projections do not include any income which may be derived after proper marketing of the vitrified material. With proper governmental support and encouragement to reuse this material, we can expect a dramatic effect on final costs.

KUBOTA AMERICA CORPORATION
THE CHRYSLER BUILDING
405 LEXINGTON AVENUE NEW YORK, N.Y. 10174 PHONE (212) 490-8050

To summarize, I would like to offer the following:

1) Vitrification is a proven form of recycling sewage sludge.

2) The vitrification system can meet all existing and proposed regulations for sludge processing systems.

3) Multiple uses can be found for the vitrified sludge.

4) This technology is available on a full scale basis today.

5) Vitrification, although on the upper end of the scale, is cost competitive with other technologies.

We believe that vitrification will become an important technology for the treatment of waste streams in the very near future, and appreciate having the opportunity to bring this technology to the attention of this Joint Committee.

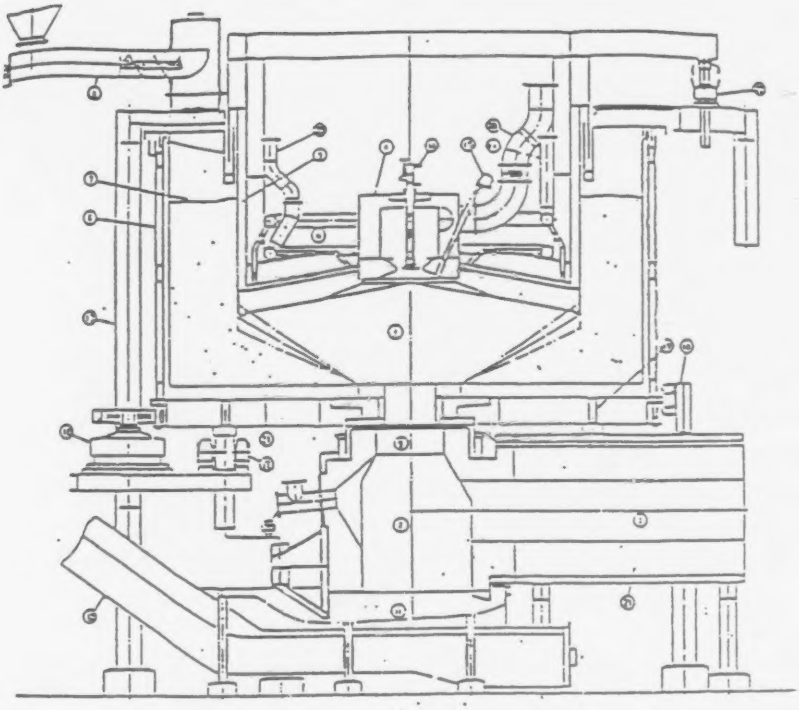

Fig. 1 Structure of Kubota Melting Furnace.

1. Primary Combustion Chamber.
2. Secondary combustion Chamber.
3. Tunnel
4. Ceiling Assembly.
5. Inner Cylinder.
6. Outer Cylinder.
7. Storage Chamber.
8. Screw Feeder
9. Slag Discharge Port.
10. Drive Assembly.
11. Slag Pit.
12. Slag Conveyor.
13. Column Support.
14. Main Burner.
15. Pilot Burner & Ultravisior
16. Water (Air) Jacket.
17. Roller.
18. Guide Roller.
19. Pin & Rack Assembly.
20. Auxiliary Burner.
21. Refractory.
22. Elevator Assembly.
23. Combustion Air Inlet.
24. Cooling Water Inlet.
25. Cooling Water Outlet.

KUBOTA AMERICA CORPORATION

State of New Jersey
DEPARTMENT OF TRANSPORTATION
1035 PARKWAY AVENUE
CN 600
TRENTON, NEW JERSEY 08625

HAZEL FRANK GLUCK
COMMISSIONER

IN REPLY PLEASE REFER TO
New Products Committe
Kubota Aggregate

March 15, 1989

Kubota America Corp.
The Chrysler Bldg.
405 Lexington Ave.
New York, NY 10174
Attn: Mr. David Greenhut

Dear Mr. Greenhut:

At our most recent Committee meeting, your product was discussed.

It was recommended that your product be tested for compliance with our current specifications through our Materials Testing section. For further assistance you may contact Mr. Henry Justus at (609)-292-4908. He will inform you of the proper procedures for testing.

A file will be kept by this Committee for further reference.

Thank you for your interest in improving New Jersey's Transportation system.

Sincerely,

Angelo A. Mendola
Secretary
New Products Committee

la

New Jersey Is An Equal Opportunity Employer

DEC 12 1988

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

DEC "8 1988

Mr. Richard M. Cogen
Nixon, Hargrave, Devans & Doyle
Attorneys and Counselors at Law
One Keycorp Plaza
Albany, NY 12207

Dear Mr. Cogen:

This is in response to your November 2, and 16, 1988 letters. In your letters you sought the Department of Environmental Conservation's view as to how the Kubota melting furnace for sewage sludge would be classified under the solid waste management hierarchy of New York State's Solid Waste Management Plan.

It is our understanding that the Kubota system melts the sewage sludge under high temperatures. The sludge is then converted into an inert, glass-like aggregate, which may be reused in a number of applications. During our past conversations, you indicated that the end products from this system have been approved by the Japanese Ministry of Construction for use as road building and construction aggregates.

As you know, the New York State Solid Waste Management Plan cites the following hierarchy of solid waste management alternatives:

- Waste Reduction

- Recycling and reuse of waste

- Waste-to-Energy systems

- Landfilling

The Kubota system would be included within the second category; that is the category of recycling and/or reuse of waste. Whether the use of such a system classified in that category (e.g. composting, the Kubota or other system) to process a portion of the solid waste stream is considered an acceptable means of achieving the State's 40% recycling goal of the solid waste stream would have to be determined on a case by case basis. Each decision would be based in part on relevant factors regarding the portion of the waste stream intended to be processed.

This letter expresses no opinion as to the applicability or inapplicability of any permitting or environmental review requirements, the eligibility of the technology for funding under any State program, or the suitability of the end products for any particular application.

If you have any further questions do not hesitate to contact me.

Sincerely,

Robert P. McCarty, P.E.
Acting Chief
Bureau of Waste Reduction
and Recycling
Division of Solid Waste

cc. N. Nosenchuck

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT
NEI nytest environmental inc

LAB. NO.: 86-12161(B)

P.O. NO.: E 1002

REPORT OF ANALYSIS

- FOR -

KUBOTA AMERICAN CORP
405 LEXINGTON AVENUE
N.Y., N.Y. 10174

June 30, 1986

p.o. box 1021 ▫ 75 urban avenue, westbury n.y 11590 ▫ (516) 334/7770, (718) 297/1449

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT
NEI nytest environmental inc

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Loc No 86-12161(B)

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TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT
NEI nytest environmental inc

Page 1 Lab No 86-12161(B)

1.0 References

1.1 Client purchase order number: E 1002

1.2 Lab. No. 86-12161(B)

1.3 Identification and listing of Hazardous Waste. Federal Register, Vol. 45 No. 98, May 19, 1980

1.4 Handbook for analytical Quality Control in Water-Wastewater Laboratories - EPA-600/4-79-019, March 1979.

2.0 Description of Tests

2.1 EP Toxicity: Ref. 1.3 para. 261.24

Identifies materials whose constituents may have a tendency to leach or migrate when disposed of improperly. The liquid phase of a sample is separated. The solid phase is extracted at pH 5 with aqueous acetic acid for 24 hours. The extract is combined with the liquid phase and analyzed.

3.0 Test Requirements

1. EP Toxicity - Table 1

4.0 Sample Identification

Slag - Sample

call box 1021 ▫ 75 urban avenue, westbury, n.y. 11590 ▫ (516) 334/7770, (718) 297/1449

Page 2 Lab No. 86-12161(B)

5.0 Sample Identification and Results

5.1 Sample Marked Slag - Sample

Date sampled: Not Available

Collected by: Not Available

Date Received by Nytest Environmental Inc.: 5|19|86

5.1.1 Results

EP Toxicity (PPM)	Max. Allowable Levels	Found
Arsenic	5.0	< 0.05
Barium	100.0	< 1.0
Cadmium	1.0	< 0.01
Chromium	5.0	< 0.05
Lead	5.0	< 0.05
Mercury	0.2	< 0.02
Selenium	1.0	< 0.01
Silver	5.0	< 0.05
Endrin	0.02	< 0.01
Lindane	0.4	< 0.01
Methoxychlor	10.0	< 0.01
Toxaphene	0.5	< 0.01
2,4-D	10.0	< 0.01
2,4,5-TP (Silvex)	1.0	< 0.01

< = Less than

Page 3 Lab No 86-12161(B)

6.0 CONCLUSION

Sample did not exhibit characteristics of EP Toxicity.

7.0 CERTIFICATION AND SIGNATURES

Report prepared by:
Adrian D'Netto
GCMS supervisor

Report reviewed by:
Peggy Sacks PS
Q. C. Manager

We certify that this report
is a true report of results
obtained from our tests of
this material.

Respectfully submitted,

Nytest Environmental Inc.

Remo Giante
Laboratory Directory

Att: Mr. D. Greenhut

dd

Report on sample(s) furnished by client applies to sample(s). Report on sample(s) obtained by us applies only to lot sampled. Information contained herein is not to be used for reproduction except by special permission. Sample(s) will be retained for thirty days maximum after date of report unless specifically requested otherwise by client. In the event that there are portions or parts of sample(s) remaining after Nytest has completed the required tests, Nytest shall have the option of returning such sample(s) to the client at the client's expense.

PRESENTATION OF MR. L. JACK DAVIS, PRESIDENT OF OXIDYNE CORPORATION, TO THE SUBCOMMITTEES ON OCEANOGRAPHY AND THE GREAT LAKES. OVERSIGHT AND INVESTIGATIONS, AND FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT ON MAY 16, 1989.

Messrs. Chairmen
Subcommittee Members

I am Jack Davis, President and Chief Operating Officer of the Oxidyne Corporation, whose home office is in Dallas, Texas. We very much appreciate the opportunity of appearing before these Subcommittees to present a brief description of our patented and proprietary deepwell wet oxidation technology.

Joining me today is Mr. Jim Eller, Senior Vice-President of Research and Engineering for Oxidyne. At the conclusion of my prepared remarks, we will respond to any questions that you may direct to us. In addition, we have prepared several packets of information about our process to be left with staff members for their use and information. I particularly call your attention to two reports prepared by Dr. Earnest F. Gloyna, who recently retired as Dean of Engineering at the University of Texas, on subcritical and supercritical water oxidation. Dr. Gloyna who now heads up the wastewater research program at the University has also prepared brief comments which I would like to submit for the record.

The Oxidyne system is based upon the use of a vertical main process vessel that is suspended up to a mile deep within a conventionally drilled and double cased well. This main process vessel provides the pressure and temperature controlled environment needed for a continuous flow wet oxidation process. These process vessels may be constructed to provide both the temperature and pressure needed for subcritical or supercritical water conditions.

Water is brought to a supercritical condition at pressures above 3,200 pounds per square inch and temperatures, above 705 degrees Fahrenheit.

The long narrow vertical configuration not only makes use of natural hydrostatic pressure but also provides an extremely efficient counter-current heat exchanger and significantly reduces the operating pressures and temperatures of above ground pumps, heat exchangers and pressure reduction devices when compared to other above ground wet oxidation systems. Because of the downhole configuration of the system, it requires a comparatively small amount of surface space and can be easily maintained in an attractive setting.

Oxidyne's systems may be used to provide treatment for a wide range of waste materials that include municipal wastewater treatment sludges; industrial sludges; high strength organic wastes; and slurried solid hazardous waste.

The subcritical Oxidyne vertical well system is designed and operated as a hydrolyzing and oxidative process vessel. In this vessel, oxygen is injected into the liquid organic waste where sufficient pressures and temperatures are reached to support liquid state oxidization. This continuous flow system converts the organic wastes into inert ash, carbon dioxide and water.

The overall subcritical Oxidyne system, when treating a municipal sludge, is designed to achieve up to 90 percent reduction of chemical oxygen demand, 95 percent removal of total suspended solids and 98 percent reduction in volatile solids. The sterile non-hazardous ash from our process has excellent settling and dewatering characteristics. The water by-product may be returned to the wastewater treatment plant for further treatment and discharge. The ash may be used as an additive for concrete blocks, roadbed material, asphalt and concrete surface material because of its non-leachable, inert quality; or it may be disposed of in a conventional sanitary landfill.

The supercritical system when fully developed by Oxidyne will provide a greater degree of destruction of organic wastes at a much higher throughput. Both systems will sufficiently oxidize heavy metals to the point that they will pass the EPA's leachate tests.

At this point, I wish to clearly distinguish the deepwell wet oxidation process from an injection well. The main process vessel is a sealed and pressurized system which doesn't allow the escape of process material into underground formations, as is the function of an injection well. The annulus of the vessel is filled with pressurized nitrogen. In the remote event that a leak develops in the outer casing, a pressure drop in the nitrogen blanket would be detected by sensors in the annulus which would cause an immediate shutdown of the entire system.

I would like to emphasize that deepwell wet oxidation is not new technology but a new combination and application of natural chemical reactions in a controlled environment. The controlled environment is provided by utilizing oil field technology and standard industrial practices, equipment and materials. The Oxidyne process combines these elements to destroy, not store, wastewater treatment sludges and other organic wastes.

In closing, I wish to point out that we believe that the deepwell wet oxidation technology will prove to be the most environmentally sound system available today. As indicated, there is no discharge to the underground environment, the minimal air discharge is harmless carbon dioxide, process water is returned for final treatment to the wastewater treatment plant and the inert ash may become a useful by-product. In brief, the result is final disposal.

Thank you for the opportunity of making this presentation. We will now be pleased to answer any questions.

May 17, 1989

Statement of

Alex G. Fassbender

before the

Subcommittees on:

Oceanography and the Great Lakes,

Oversight and Investigations, and

Fisheries and Wildlife and the Environment

concerning the practicality and feasibility of

technological alternatives to ocean dumping of

municipal sewage sludge.

Good morning Mr. Chairman, Members of Merchant Marine and Fisheries Committee and Colleagues. My name is Alex Fassbender and I hold the position of Manager of Technology Commercialization at the Department of Energy's Pacific Northwest Laboratory operated by Battelle Memorial Institute.

Battelle and I sincerely appreciate your interest and the opportunity to discuss the practicality and feasibility of technological alternatives to ocean dumping of sewage sludge.

INTRODUCTION

Water quality and the global environment continues to be a major concern of both the public and Congress. Title I of Public Law 100-688, "The Ocean Dumping Ban Act of 1988" has clearly mandated the cessation of ocean disposal of sewage sludge. Recent proposed regulations put forth by the Environmental Protection Agency (Proposed 503 Regulations) devote attention to minimizing the potential for heavy metal contamination of cropland which could result from application of sludge derived products. Many cities are feeling the pinch of legal and regulatory constraints on one side and physical and financial constraints on the other. A sewage treatment plant never gets a recess or a holiday. It faces a never ending flow of waste water and sludge and there is an urgent need for better sludge disposal methods.

THE SLUDGE-TO-OIL REACTOR SYSTEM

The Sludge-To-Oil Reactor System (STORS) is a new sludge and wet biomass disposal process which:

Produces more energy than it consumes,

Precipitates and removes heavy metals from the sludge,

Destroys and/or concentrates toxic organics,

Uses a small amount of space, and

Eliminates the need for anaerobic digesters.

The STORS technology addresses many of the physical and financial constraints of sewage sludge disposal.

Sludge Disposal

Mechanically dewatered sewage sludge is typically 80% water and 20% solids and is difficult or impossible to further concentrate without vaporizing the 80% water. As landfill, land application and ocean dumping options are curtailed or closed, Municipal Authorities have responded by adding incineration or composting facilities or hauling sludge to distant landfills. These processes require significant energy inputs because they have to transport or vaporize the 80% water to dispose of the 20% solids in the sludge. With the STORS process, the

80% water is efficiently separated from the 20% solids.

STORS Thermodynamic Superiority

The STORS process does not vaporize the water in sludge and is thermodynamically superior to any fuel based process that does vaporize the water in sludge. The STORS process chemically converts the organics in the sludge into oil while under enough pressure to prevent the water from boiling. The operational pressures are within the American Society of Mechanical Engineers (ASME) boiler and pressure vessel code 2500 psi steam rating. The STORS reactor and components can be fabricated with off-the-shelf items to standard insurance underwriter and industrial codes.

STORS converts the sludge organics into an oil product that is insoluble in water. The oil product has a heating value of 80 to 90% that of diesel fuel. The separation of the oil from the water occurs spontaneously like oil and vinegar salad dressing. This greatly simplifies processing. As a result, STORS generates more useful energy in the form of oil than it uses. The thermodynamics of the STORS process can stabilize the cost of sewage sludge disposal in the face of rising fuel costs and enhance our nation's energy independence goals.

Heavy Metal Removal

A char product containing up to 60% of inorganic ash originally present in the sludge is also formed. The char has the bulk of the heavy metals concentrated in it. The hydroxide, oxide and carbonate salts of most heavy metals are relatively insoluble, and are precipitated from solution during the STORS process. Chromium is concentrated about twofold in the char, copper four to six fold, zinc two to fourfold, and lead three to sixfold. The heavy metal hydroxide, oxide and carbonate salts are readily fixed in a highly stable matrix when mixed with concrete grout. Thus, STORS removes heavy metals in a form ready for ultimate disposal.

The water originally in the sludge is separated from the oil and subjected to further treatment. The sludge water contains about 10% to 15% of the organics originally present in the sludge and can be treated to acceptable chemical oxygen demand (COD) levels by either chemical and biological methods.

Toxic Organic Destruction

The STORS process itself can degrade some toxic organic materials which may be present in sludge. Preliminary laboratory work has demonstrated destruction of chloroform, lindane, and a 2,4,5-T analog. In addition, during oil-water separation, oil soluble organics are concentrated in the oil. Since the STORS oil has a high heating value and contains only traces of water, it will readily burn at much higher high temperatures. The high temperature combustion of STORS oil enables efficient energy recovery and ensures destruction of toxic organics. This is especially important for communities which must incinerate their sludge because it contains significant levels of toxic organics.

Small Size and Easy Fit

The STORS process is compact and integrates well with existing waste water treatment facilities. STORS requires much less space to do the same job as other technologies. This is most important in large cities where additional capacity may be desired but space is not available. In many cases, implementation of the STORS process could free-up space at existing facilities to allow capacity expansion or other land use options.

The compactness of the STORS process is demonstrated in the following example. The residence time of the sludge (20% solids) in the STORS reactor is about one hour. This compares with residence times of 21 to 28 days for anaerobic digestion (3% solids) and a similar time for composting (20% solids plus support material). The amounts of sludge in process at a given time or the instantaneous inventory for STORS, anaerobic digestion and composting for a 100 dry ton per day facility are 21 tons, 70,000 to 93,000 tons, and 21,000 to 28,000 tons respectively. In many cases, sludge is digested before it is incinerated or composted and in those cases the digestion tonnages should be added for comparison with STORS.

STORS Demonstration Needed

Although STORS is a new technology and is unproven at commercial scale, its development has been supported by the Department of Energy, the Environmental Protection Agency and private industry. The process chemistry is backed by more than ten years of basic research and development of the thermochemical liquefaction of sludge and many other wet biomass feed stocks. One pilot plant was constructed and operated and another has been designed and is under construction. Battelle has licensed their know how in the STORS technology to the Innotek Corporation of Little Rock, Arkansas. We believe that STORS is a practical, economic and feasible technology for sludge disposal.

Thank You.

DEHYDRO-TECH CORPORATION STATEMENT

PRESENTED TO

U.S. HOUSE OF REPRESENTATIVES

Committee on
Merchant Marine and Fisheries

Subcommittee on
Oversight and Investigations

Dehydro-Tech Corporation is grateful for the invitation from the U.S. House of Representatives, Committee on Merchant Marine and Fisheries to address your esteemed Subcommittee and to assist you in your challenging quest to clean our environment and improve the quality of our waters and, therefore, our very lifestyle.

Even before the enactment of the Ocean Dumping Ban, Dehydro-Tech Corporation was designing sludge drying facilities utilizing the patented Carver-Greenfield Process® in the United States and overseas. Several years ago, the US EPA designated the Carver-Greenfield Process® "innovative and alternative" and funded four large projects in the United States.

The Carver-Greenfield Process® is a very efficient drying process utilizing a multi-effect evaporation drying system using a light oil as the fluidizing medium. This system is particularly suitable to drying municipal sewage, industrial and even hazardous sludges.

The light oil used for fluidizing the sludge is recovered and recycled over and over. The sewage oil, representing 10% to 20% of the sludge, is separated from the fluidizing oil and solids and can be used as a fuel oil to produce energy, including the steam required to drive the entire process. The dry solids product may be used as a high quality fertilizer, free of pathogens or bacteria and rich in nitrogen and phosphorus; it may also be combusted to produce steam or electricity for other uses or for sale to offset the operating costs of the process.

The Carver-Greenfield Process® has a history of more than 30 years, with over 80 installations around the world in diversified applications. Three large facilities are presently under construction in the County of Los Angeles, California, and in Trenton and Ocean County, New Jersey. The fourth large municipal sludge plant, the Hyperion Plant in the City of Los Angeles, is now operational. When it reaches full capacity, this plant will handle the sludge of the waste water of the City of Los Angeles - over 500 million gallons per day - producing in excess of two million gallons of oil derived from sludge, and over 82,000 tons of solids per year. The combination of the sludge oil and dry sludge solids, plus the methane gas produced in the sludge digesters will generate 220,000,000 KW hours of electricity per year.

There are three municipal sludge Carver-Greenfield facilities in Japan, in the cities of Tokyo, Fukuchiyama and Hiroshima. The last two began combusting their dried sludge and producing steam about 15 years ago. The Tokyo plant, which was just commissioned, is combusting its dry sludge to generate electricity.

The Mercer County Improvement Authority communities in New Jersey will be feeding raw sludge to their Carver-Greenfield facility, thereby avoiding expensive digester installations. Further, this plant will be marketing a fertilizer product produced at a low energy cost. At the same time, the sewage oil extracted from the sludge will be combusted to produce all the steam required for the process and half of the electricity required by the facility.

The energy requirement to evaporate water in the Carver-Greenfield Process® is less than 400 B.T.U.'s per pound of water evaporated, compared to competitive processes requiring 1500 to 2000 B.T.U.'s per pound of evaporated water. In the Ocean County installation, the evaporation energy requirements will be even lower, about 200 B.T.U.'s per pound of water evaporated, due to the use of the newer, highly efficient Mechanical Vapor Recompression technology. This does not include credit for extracted sewage oil, which often reduces outside energy requirements to zero.

Since the Carver-Greenfield Process® effectively evaporates the water from the sludge, the condensed water is clean, suitable for disposal or recycling with minimum treatment requirements.

The production of a dried powder product minimizes freight costs and extends the marketing potential of the product as a fertilizer or fuel over a wide area. The dry powder can be combusted more efficiently than wet sludge, requiring smaller volume furnaces and eliminating boiler tube corrosion normally associated with high moisture fuels. Also, the resulting higher combustion temperatures assure the complete destruction of any residual toxic materials.

A unique feature of the Carver-Greenfield Process® is that it removes the sludge oil from the dried sludge and with it virtually all of the oil soluble compounds, such as pesticides, herbicides, dioxins, PCB's, cleaning fluids, etc., which may be in the original sludge. They can then be safely combusted and destroyed with the sludge oil.

Foster Wheeler Corporation is Dehydro-Tech's licensee for large sludge drying facilities in the United States.

In the interest of time, we have attached a copy of our latest corporate brochure to this statement. We believe that the easy to read content and pictures give a good understanding of the Carver-Greenfield Process® and its suitability to provide environmentally sound and cost-effective solutions to the challenge of municipal sludge management.

Recognizing the important work of this Subcommittee, perhaps it would be appropriate to close this brief statement with a quote from President Theodore Roosevelt in his Message to Congress on December 3, 1907:

> "To waste, to destroy our natural resources, to skin and exhaust the land instead of using it so as to increase its usefulness, will result in undermining, in the days of our children, the very prosperity which we ought by right to hand down to them, amplified and developed."

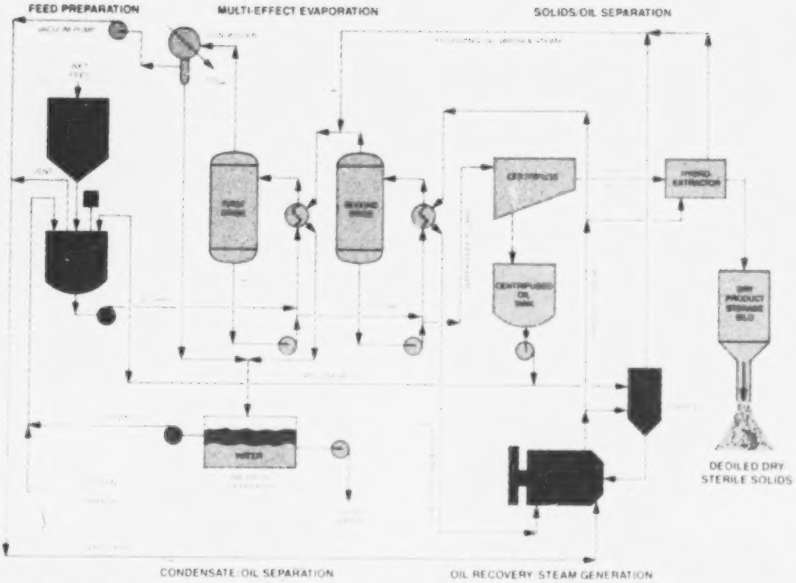
To the extent that, as a result of this meeting, this Subcommittee would have moved a step closer to understanding the true potential of the currently available sludge management technologies, it would have taken an important step in the direction of improving our environmnet in our lifetime and for future generations.

Respectfully,

Charles Greenfield

Charles Greenfield
Chief Executive Officer

Ernest A. Kollitides, P.E.
President & Chief Operating Officer

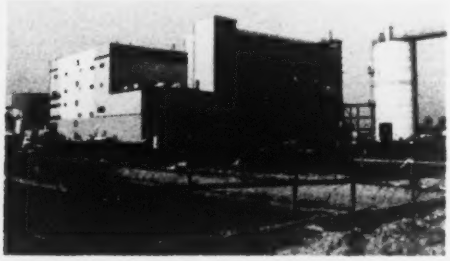

FEED PREPARATION
MULTI-EFFECT EVAPORATION
SOLIDS/OIL SEPARATION
VACUUM PUMP
WET FEED
VENT
CENTRIFUGE
HYDRO EXTRACTOR
CENTRIFUGED OIL TANK
DRY PRODUCT STORAGE SILO
WATER
DEOILED DRY STERILE SOLIDS
CONDENSATE/OIL SEPARATION
OIL RECOVERY/STEAM GENERATION

CARVER-GREENFIELD PROCESS® : SIMPLIFIED TWO EFFECT EVAPORATION FLOW DIAGRAM

THE CARVER-GREENFIELD PROCESS® BRIEF DESCRIPTION

The Carver-Greenfield Process® is a continuous, multiple effect evaporation process which is capable of energy efficient physical separation of multi-phase materials into solid, oil and water phases. The basis of the process is the suspension of the water containing solids in carrier oil. This carrier oil keeps the viscosity of the mixture low, achieves high heat transfer rates and prevents scaling or fouling of the heat transfer surfaces as the water content of the mixture is evaporated.

County Sanitation Districts of Los Angeles County Carver-Greenfield Plant



The resultant solids are virtually water-free. The fluidizing oil is separated from the dry solids and reused in the Process. Depending on their nature, the dry solids may be used as fuel, fertilizer, animal feed or other useful products. Oil indigenous to the material being processed is extracted and may be used as fuel or for its commercial value.

The carrier oil used is based on the type of desired dry product. If the product is to be combusted, a fuel oil can be used. For fertilizers, a "pure cut" hydrocarbon oil is employed. USFDA approved oils are available where the end product is intended for animal feed. Non-volatile oils indigenous to the feed material can also be used.

Pathogens, bacteria and viruses are destroyed, while uniform product quality is preserved by the even distribution of heat throughout the system. All gaseous emissions, including vent gases, are collected and eradicated.

The United States Environmental Protection Agency, which has studied current drying technologies, has designated the Carver-Greenfield Process "innovative and alternative," and has funded a number of large Carver-Greenfield projects.

ENVIRONMENTAL POLICY INSTITUTE
FRIENDS OF THE EARTH
OCEANIC SOCIETY

218 D Street SE • Washington, D.C. 20003 • (202) 544-2600
Oceanic Society: 1536 16th Street NW • Washington, D.C. 20036 • (202) 328-0098

STATEMENT OF
SALLY ANN LENTZ

ON BEHALF OF

THE OCEANIC SOCIETY
ENVIRONMENTAL POLICY INSTITUTE
FRIENDS OF THE EARTH
AND
NATURAL RESOURCES DEFENSE COUNCIL

BEFORE THE SUBCOMMITTEES ON
OCEANOGRAPHY AND THE GREAT LAKES,
OVERSIGHT AND INVESTIGATIONS
AND FISHERIES AND WILDLIFE CONSERVATION AND
THE ENVIRONMENT
CONCERNING
IMPLEMENTATION OF P.L. 100-688

May 17, 1989

I. Introduction

I am Sally Ann Lentz, Staff Attorney for the Oceanic Society. The Oceanic Society is a 40,000 member non-profit organization devoted to the protection, conservation and wise use of marine and coastal resources. In all of the Society's activities, it is dedicated to protecting the oceans for the people and wildlife that depend upon them for life, livelihood and enjoyment. Earlier this year the Oceanic Society merged with Environmental Policy Institute and Friends of the Earth (OS/EPI/FOE). This testimony is presented on behalf of OS/EPI/FOE, as well as the Natural Resources Defense Council (NRDC), which contributed to this submission.[1] The NRDC, a national organization with over 83,000 members, is dedicated to protecting public health and the environment against pollution, and to preserving natural resources for current and future generations. OS/EPI/FOE and NRDC actively support the rapid phase-out and halt of sludge dumping in the ocean.

In September, 1988, Congress made a commitment to end ocean dumping of sewage sludge by enacting the Ocean Dumping Ban Act of 1988 (the Act), P.L. 100-688. The Act became law on November 18, 1988.

The Oceanic Society and NRDC submitted written comments on February 17, 1989, at a public meeting on EPA implementation of the Act, including EPA's efforts to establish schedules for phasing out sludge dumping, as well as the issuance of EPA permits. An opportunity for public comment was not provided at that meeting, and no public record of the meeting was maintained. At that meeting, we emphasized our view that the Act directs EPA to put an end to sewage sludge dumping in the ocean in a manner consistent with other laws protecting the environment. EPA's actions thus far have not demonstrated significant progress to that end. We have yet to see agreements ending ocean dumping, and the proposed ocean dumping permits violate not only the requirements of the Marine Protection Research and Sanctuaries Act, 33 U.S.C. 1401-1444, (MPRSA), but other protective environmental laws as well.

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[1] Lynne Edgerton, Coastal Project Attorney and Jessica Landman, Clean Water Project Attorney of NRDC contributed to this testimony.

On March 24, 1989 the Environmental Protection Agency (EPA) published its tentative determination to issue special permits to transport and dispose of municipal sewage sludge under MPRSA (hereafter, tentative determination). OS/EPI/FOE and NRDC undertook an analysis of the proposed permit in response to EPA's request for public comments. The analysis has raised a number of questions and concerns which must be resolved before EPA issues the permits. A discussion of deficiencies in the proposed permits was provided to EPA in written comments submitted by OS/EPI/FOE and NRDC on April 27, 1989.

Our testimony will address the following stated topics of interest to the Subcommittees:

- the status of negotiations for compliance or enforcement agreements, including schedules for ending ocean dumping and alternative plans;
- the status and terms of proposed permits;
- the status of plans for monitoring both for regulatory compliance and environmental impacts of sludge disposal, including the recent EPA Inspector General report on monitoring at the 106-Mile Site; and
- the practicality and feasibility of technological alternatives to ocean dumping.

The first of these topics is discussed in Part II of our testimony. The environmental monitoring plan for the 106-Mile Site and the Inspector General report are discussed in Part IV. The remaining topics are discussed in the context of considering the adequacy of EPA's recently proposed permits for ocean dumping in Part III of our testimony.

II. Status of negotiations for compliance and enforcement agreements

It is our understanding that EPA has not yet been able to negotiate compliance or enforcement agreements with the nine ocean dumping municipalities. Section 104B(c)(6) of the Act expressly requires that the EPA "provide an opportunity for public comment regarding the establishment and implementation of compliance and enforcement agreements." Yet, EPA has not yet provided any opportunity for public participation in the establishment of such proposed agreements. While we understand that EPA had hoped to publish the draft agreements by March 1, 1989 for public comment, the dumpers' and EPA's failure to reach an agreement has produced a two-month delay -- a delay which suggests that they may not be able to meet the deadlines for public participation and achievement of agreements by August 14, 1989.[2]

Because we have not been informed in detail in any formal way about the dumpers' proposed schedules and alternate plans, we cannot comment on them at this time.

III. The Status of Proposed Permits

The Act does not exempt current or future dumping permits from the requirements of MPRSA. EPA's proposed permits are deficient in meeting the requirements of MPRSA because the applications on which they are based: (1) do not satisfy the applicable environmental impact criteria; (2) fail to fully consider land-based alternatives to ocean dumping; (3) fail to adequately consider the impact on aesthetic, recreational and economic values; (4) fail to adequately consider the impact on other uses of the ocean; (5) propose the use of an unacceptable ocean dumpsite; and (6) fail to provide for adequate monitoring of the site.

In addition to the failure of the applications to satisfy the requirements of the MPRSA, they do not satisfy the requirements of other applicable federal laws. Further, the proposed permits are deficient in the limitations and conditions placed upon dumping activities. All of these deficiencies are discussed in detail below.

We wish to point out at the outset, however, that EPA appears to have reversed the order of events, by issuing proposed permits before a compliance or enforcement agreement is in place. Under section 104B of the Act, no person may continue ocean dumping sewage sludge more than 270 days after its enactment (August 14, 1989) unless that person enters into a compliance agreement or enforcement agreement and also obtains a permit pursuant to section 102 of MPRSA. In fact, the successful negotiation of a compliance or enforcement agreement is a precondition to the issuance of a permit (Section 104B(c) of the Act). As a result, no municipality may dump sewage sludge in the ocean after August 14, 1989 unless it has entered into a compliance or enforcement agreement with EPA and obtained a permit to continue dumping.

The EPA's tentative decision fails to even mention the requirement for establishment of compliance and enforcement agreements, much less include as a permit requirement that the dumpers enter into such an agreement or specify reasonable dates for implementation of alternative land-based disposal. At minimum, the proposed permits should include a schedule for phasing out ocean disposal of sewage sludge by December 31, 1991, as required by section 104(B)(a)(1)(A) of the Act. Absent such a schedule the proposed permits violate the Act and should be revised accordingly.

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[2] We understand that all six New Jersey sewerage authorities have recently filed suit over the issue of whether they must enter into compliance agreements or enforcement agreements (Passaic Valley Sewerage Commissioners et. al. vs. Administrator of EPA, Complaint No. CA89-1670, April 19, 1989). The sewerage authorities claim that since they will have phased out ocean dumping of sewage sludge by December 31, 1991 using interim measures, they are entitled to enter into a compliance agreement. EPA officials, on the other hand, have publicly stated that because the New Jersey sewerage authorities will be using an interim measure and not a "fully implemented alternative system" by December 31, 1991 the authorities must sign an enforcement agreement. This litigation could further delay the negotiations between EPA and the dumpers.

A. The Proposed Permits Do Not Satisfy the Requirements of the Ocean Dumping Act and Regulations

Regulations promulgated under the MPRSA (40 CFR Part 227 (hereinafter, the "ocean dumping regulations"), authorize the issuance of ocean disposal permits only after consideration of the environmental effects of the proposed dumping operation, the need for the ocean dumping -- including the consideration of alternatives -- and the effect of the proposed action on aesthetic, recreational and economic values and other uses of the ocean. The Act does nothing to change those basic requirements. Ocean dumping of sludge under the proposed permits does not satisfy these criteria.

1. The proposed permits do not satisfy the applicable environmental impact criteria

Section 227.4 of the ocean dumping regulations establishes criteria for evaluating environmental impacts of proposed dumping activities. Under this section, environmental acceptability is presumed if the applicable environmental prohibitions, limits, and conditions are satisfied. Under this provision, EPA must determine that the disposal will present:

(a) No unacceptable adverse effects on human health and no significant damage to the resources of the marine environment;

(b) No unacceptable adverse effect on the marine ecosystem;

(c) No unacceptable adverse persistent or permanent effects due to the dumping of the particular volumes or concentrations of these materials; and

(d) No unacceptable adverse effect on the ocean for other uses as a result of direct environmental impact.

a. Ocean dumping of sewage sludge under the proposed permits is environmentally unacceptable

The sewage sludges currently ocean dumped by New York City and the other New York and New Jersey Sewage Authorities are contaminated with low, but environmentally significant levels of persistent toxic pollutants, including organohalogens (e.g. PCBs), carcinogenic petroleum fractions (particularly polynuclear aromatic hydrocarbons (PAHs), toxic heavy metals (e.g., cadmium, mercury, lead), and pathogenic (disease producing) microorganisms.

Degradation of the marine environment resulting from ocean dumping of such contaminated sewage sludge is well documented. Ecological effects attributed wholly or in part to the ocean dumping of municipal sludge include:[3]

- o closure of shellfish beds;
- o introduction of viral, bacterial, fungal and protozoan pathogens into the area of impact;
- o elevated levels of heavy metals (e.g. cadmium, mercury, lead, copper, chromium) and toxic organic compounds (e.g., PCB's) in bottom sediments;
- o reduced bottom dissolved oxygen levels;
- o reduced catches of bony fishes;
- o alterations in the benthic biological community, particularly the proliferation of stress-tolerant species and loss of more sensitive species;
- o observed sublethal effects in organisms, including reduction of reproductive functions, bioaccumulation, and increased bacterial resistance to antibiotics and toxic metals;
- o increased incidences of liver tumors, fin rot and black gill;
- o mutation of fish larvae and decreased survival of offspring; and
- o planktonic blooms and anaerobiosis (resulting from introduction of carbon and nutrients).

The tentative determination states (at 6) that EPA has determined that the disposal would not unduly degrade or endanger the marine environment and would not result in unacceptable adverse effects on the marine ecosystem. However, there is no information or data presented upon which this determination has been made. From what we know of monitoring efforts to date, we believe there is insufficient data upon which to base this conclusion. What small amount of biological monitoring has been done at the dump site indicates that there has been degradation of the plankton community. Extrapolation of the monitoring results at the 12-mile site suggest that there is strong reason for concern about biological effects and that conclusions should not be drawn without substantial field data.

It is stated in the tentative determination (at 6) that EPA has determined that the disposal would not result in unacceptable adverse impacts on human health or significant damage to marine resources. Yet, this conclusion appears to be based solely on conjecture. There have been no bioassays run in the lab or in the field to determine the extent of bioaccumulation of toxic materials in any species, including commercially valuable species, due to continual sludge dumping over long periods of time. Bioaccumulation and its effects are one of the most likely harmful results of continued sewage sludge dumping, yet it is dismissed without any scientific data. The extent to which bioaccumulation will occur in fisheries species will determine whether there is a threat to those resources or to human consumers. Furthermore, the effects of bioaccumulation due to sewage sludge disposal must be considered in combination with the bioaccumulation occurring as a result of other pollution sources.

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[3] Anderson, Dr. Peter W., Statement for the Public Hearing on the Tentative Denial to Redesignate the 12-Mile Sewage Sludge Dump Site, at 8.

It is stated in the tentative determination (at 6) that EPA has determined that the disposal would not result in "unacceptable adverse persistent or permanent effects due to either the dumping o[f] particular volumes o[r] the concentration of these materials." It is again evident that EPA is basing its determination on no data. Never has EPA considered effects of total volumes of toxics dumped or to be dumped as a result of this activity, nor has EPA considered cumulative effects due to the concentration of contaminants over long periods of time.

It is stated in the tentative determination (at 9) that "the quantity of sewage sludge authorized for dumping shall be limited to prevent long-term damage to the environment or to amenities. The proposed permit will limit the annual volume of sludge that may be dumped." However, the annual limitations listed in the draft permit (at 7) are based on the anticipated volumes of sludge production by the various sewage authorities and not on environmental considerations.

Furthermore, EPA has refused to use the results of chemical analyses which give the concentrations of toxic materials in the suspended particulate and liquid phases combined. EPA claims this data cannot be used because the regulations for water quality refer only to concentrations in liquid phase and the laboratory analyses have not been able to separate liquid and suspended particulate phases. Nevertheless, in sewage sludge much of the toxic material is associated with particulates and it is environmentally irresponsible and unjustifiable to ignore the data for the two phases combined.

Because much of the metal component of the waste is associated with particles, the net result is an introduction of metals to open ocean waters. From data provided by New York City's permit application to continue dumping at the 106-Mile Site, the Oceanic Society has conducted an analysis of the chemical constituents of New York City's sewage sludge. Tables I and II provide estimates of the amounts of hazardous materials contained in the New York City sludge which were dumped during 1986 and 1987. Despite gross deficiencies in New York City's testing method (which would lead to much greater estimates), we have found that roughly 264,000 kg/year of Zinc, 227,000 kg/year of Copper, 146,000 kg/year of Chromium and 100,000 kg/year of lead have been ocean dumped by New York City alone (which accounts for 45% of the total sludge dumped).

Obviously, the sludges proposed for dumping are extremely toxic, as is confirmed by past bioassay results. Although the toxic effects of the sludge are predicted to be rapidly reduced by dilution, high levels of mortality for plankton are expected prior to dilution to a "non-toxic" level.

The sensitivity of open ocean phytoplankton to metals is well documented, and the significance of the productivity of plankton to the global carbon cycle is only now being recognized.

EPA states in the tentative determination (at 13):

> Effects on plankton have been observed in the immediate barge wake. These effects are short-term because the recovery or regeneration time of these organisms is short and only a small percentage of the plankton community is ever exposed to the waste. No long-term changes in the biota at the site have been observed as a result of sewage sludge disposal.

We seriously question EPA's conclusion that plankton are unaffected by the dumping activity. If plankton are indeed adversely affected in the wake of the barge, and dumping at the site is continuous, it would appear that there will be little opportunity for recovery and regeneration. While no long term changes "have been observed" at the site, there is no evidence to suggest that EPA has actually sought to determine such changes. Also, it is not clear how it is determined what percentage of the plankton community is exposed.

The findings of adverse effects at the site suggest that dumping at the site may already have resulted in significant damage to the resources of the marine environment and unacceptable adverse effects on the marine ecosystem, in and around the dump site. These findings, coupled with the adverse consequences of past dumping activities, suggests that the requirements of Section 227.4 of the ocean dumping regulations are not met by the proposed permits.

b. Constituents Prohibited as Other Than Trace Contaminants

The proposed permits would allow the dumping of mercury, cadmium, lead, chromium, PAHs and known carcinogenic or mutagenic material (copper, PCBs), which are prohibited from dumping under Section 227.6(a)(2), (3), and (5) of the regulations. EPA has determined, however, that:

> Based upon the applications, none of the above constituents are present in the sewage sludge as other than trace contaminants and as substances that would not be rendered rapidly harmless in the marine environment.

In this regard, Section 227.6(f) of the regulations provides (Emphases added):

> when the applicant can demonstrate that such constituents are (1) present in the material only as chemical compounds or forms (e.g., inert insoluble solid materials) non-toxic to marine life and non-bioaccumulative in the marine environment upon disposal and thereafter, or (2) present in the material only as chemical compounds or forms which, at the time of the dumping and thereafter, will be rapidly rendered non-toxic to marine life and non-bioaccumulative in the marine environment by chemical or biological degradation; provided that they will not make edible marine organisms unpalatable; or will not endanger human health or that of domestic animals, fish, shellfish, or wildlife.

Specifically, Section 227.6(c)(2) requires that bioassay results on the suspended particulate phase of the waste do not indicate occurrence of significant mortality or significant adverse sublethal effects including bioaccumulation due to the dumping of wastes.[4] The chemical and biological analyses requirements specified in the permit are inadequate. The chemical characterization data submitted by the permittees should be confirmed by EPA if they are to be used to recalculate sludge discharge rates. The bioassays are inadequate in that they test only for acute toxicity and do not include tests for chronic sublethal effects and bioaccumulation. Furthermore, the test species are not characteristic of the 106-mile site and are inshore species noted to be more tolerant of many environmental perturbations than are open ocean species. Bioassays should be conducted on species characteristic of the disposal site, sensitive life history stages, and fishery species that may be subject to the effects of sewage sludge dumping. Until such bioassays are conducted, compliance with this legal requirement is not achieved.

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[4] See, discussion of "limiting permissible concentration," below.

c. Reliance on discharge rates to achieve environmental protection is inappropriate

EPA erroneously relies upon a concept of dilution to achieve environmental protection. The Agency believes that if the sludge is diluted in open ocean waters to meet a designated "limiting permissible concentration" (LPC), outside the site boundaries after a 4-hour initial mixing period, that the marine environment will be protected. Such dilution is to be achieved through the establishment of discharge rates based upon the toxicity of the sludge.

Section 227.8 of the ocean dumping regulations specify that:

> No wastes will be deemed acceptable for ocean dumping unless such wastes can be dumped so as not to exceed the limiting permissible concentration as defined in 227.27.

Under Section 227.27 the measure of "initial mixing" is only applied to the liquid phase of the waste. A difference in initial mixing might be expected between a deep ocean site such as the 106-Mile Site and a nearer shore site. By contrast, for the suspended particulate and solid phases of the sewage sludge (which contain most of the potentially harmful materials) the limiting permissible concentration (LPC) is defined strictly on the basis of laboratory toxicity and bioaccumulation tests, the results of which are uninfluenced by the choice of disposal site. It appears that no effort has been made to conduct bioaccumulation tests for the waste that is currently being ocean dumped at the 106-Mile Site.

For this reason, we do not support the restriction of discharge rate based on acute toxicity studies as the sole means of regulating sewage sludge dumping in the ocean. The speed of discharge affects only the instantaneous effects of the sludge and does not address long-term, sublethal effects. Multiplying the LC50 (the concentration at which 50% of the test organisms die) by an arbitrary factor of 0.01 does not compensate for chronic effects due to repeated exposure and bioaccumulation. Additional tests for bioaccumulation are necessary to adequately protect the marine ecosystem from significant damage.

2. The proposed permits do not satisfy the applicable criteria for establishing need for the ocean dumping

Both the London Dumping Convention (LDC) and MPRSA require a finding of need before ocean dumping is allowed. Existing regulations under MPRSA interpret the needs determination as requiring a comprehensive evaluation of potential reduction, treatment, and disposal options for the waste proposed for dumping (227.14 - 227.16). Currently, a permit for ocean dumping in the U.S. will be issued only upon demonstration that:

> [t]here are no practicable improvements which can be made in process technology or in overall waste treatment to reduce the adverse impacts of the waste on the total environment...

and

> [t]here are no practicable alternative locations and methods of disposal or recycling available, including without limitation, storage until treatment facilities are completed, which have less adverse environmental impact or potential risk to other parts of the environment than ocean dumping...

Also under existing U.S. regulations, permittees may:

> be required to terminate all ocean dumping by a specified date, to phase out all ocean dumping over a specified period or periods, to continue research and development of alternative methods of disposal and make periodic reports of such research and development in order to provide additional information for periodic review of the need for and alternatives to ocean dumping....[5]

The existing regulations reflect the spirit in which the MPRSA was enacted. The intent is to ensure that the use of ocean dumping will not impede the development of better solutions to hazardous waste disposal. This goal is achieved by strictly limiting the use of ocean dumping when environmentally acceptable methods for reduction, treatment, and disposal are available on land.[6]

This same spirit is reflected in the needs determination required under the LDC, which states that before any permit for dumping may be issued, the permitting authority must consider "[t]he practical availability of alternative land-based methods of treatment disposal or elimination, or of treatment to render the matter less harmful for dumping at sea." LDC Annex III(C)(4). Thus, like the existing ocean dumping regulations, the LDC maintains a presumption against ocean dumping in favor of practicable alternatives.

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[5]. 40 CFR 227.16(c).

[6]. Section 2(b) of the Ocean Dumping Act, Public Law 92-532, October 23, 1972, states (Emphasis added):

> The Congress declares that it is the policy of the United States to regulate the dumping of all types of materials into ocean waters and to prevent or strictly limit the dumping into ocean waters of any material which would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities.

This legal requirement for a demonstration of need for ocean dumping of sewage sludge has not been met by those who propose to continue dumping at the 106-Mile Site. Indeed, over 200 sewage treatment plants which had used the 12-Mile Site ceased ocean dumping and implemented land-based methods by December 31, 1981. Such methods include, creating compost or fertilizer from sludge, or dewatering and land application of sludges. Other less preferred alternatives include incineration of sludge or co-incineration of sludge and solid waste.

a. The need for pretreatment

A major obstacle to the use of such alternatives for sludge which is currently ocean dumped is the high level of heavy metals and other toxic contaminants which are present in the sludge at issue. The characteristics of any particular sludge depends upon the kind and quantity of inputs to the treatment plant (including urban runoff and industrial waste), as well as the process used by the plant and its efficiency. This points to the real problem at the heart of the current dilemma -- the failure of the subject municipalities to institute effective pre-treatment and industrial waste reduction programs. Neither ocean dumping nor any of the land-based alternatives are environmentally acceptable options for managing highly contaminated sewage sludge. Effective pre-treatment improves the quality of the sludge and must go hand-in-hand with any chosen management option, including ocean dumping.

The normal process of treating sewage concentrates toxic contaminants from the raw sewage into the sludge, to create a clean effluent (in theory) that may be discharged into inland and coastal waters without adverse environmental consequences. To dispose of the contaminated sludge in the ocean defeats the purpose of its treatment to improve water quality.

The quality of the sludge is greatly improved when industrial pretreatment is rigorously pursued. Industrial pretreatment reduces the high concentration of heavy metals and synthetic organic compounds in the sludge by limiting industrial discharges into the sewage system. Pretreatment generates cleaner effluent and cleaner sludge, and the cleaner the sludge is, the greater are the number of alternative management options for dealing with it in an environmentally sound manner.

As discussed in more detail below, EPA should incorporate Clean Water Act requirements into these dumping permits so that a violation of those requirements will constitute a violation of the dumping permit.

In addition, pretreatment must be complimented with efforts to reduce the generation of industrial waste. Chemicals that are safer to dispose of from an environmental perspective are often available and can be substituted for more toxic chemicals. The use of these safer alternatives must be encouraged.

b. Preferred alternatives to ocean dumping

The management of sewage sludge should be viewed in the context of an overall scheme for managing waste. The environmental community generally subscribes to a hierarchy of waste management options which recognize that when toxic chemicals or heavy metals are introduced into the environment, inevitable risks are created. Risk minimization requires emphasis on reducing waste at its source, recycling and recovery, waste treatment and destruction. Disposal -- either in the ocean or on land -- is viewed as the least attractive, bottom tier approach. Every effort should be made to utilize waste management options that are higher in that hierarchy.

As regards the management of sewage sludge, two options falling at the higher end of the waste hierarchy which offer beneficial uses of the sludge deserve special mention, i.e., use of sludge for generating fertilizer or compost.

1. Sludge as Fertilizer

After sludge is treated in both primary and secondary treatment, it can be processed further in digesters (underground tanks where solids are heated to 95° F, mixed continuously and deprived of oxygen). While in the digester, bacteria decompose human fecal wastes, ground food from garbage disposals, and reduce waste concentrations from industries. The resultant organic, sludge slurry can be used as a fertilizer for agriculture, forests, land reclamation, or land dedicated to sludge disposal. In the first three cases, sludge spread on the land improves the land by facilitating nutrient uptake, increasing water retention, permitting easier root penetration, and improving soil texture (reduces runoff and eases soil workability). In the fourth case, large quantities of sludge are applied over a land area for many years. This practice acts as a treatment system whereby soil is used to bind metals and soil microorganisms, sunlight, and oxidation to destroy the organic matter in the sludge. Approximately 25% of the nation's sludge is land applied today.

Despite its benefits, land application of sludge has its limitations as well. It may not be applied on all types of soil, e.g., soils with a water table of less than two feet; soils subject to flooding and ponding, and very sandy soils. Strict regulations must be adhered to in land application of sludge to protect groundwater and to prevent adverse impacts from heavy metals or pathogens present in the sludge. In addition, the very strong odor emanating from most sludge is an important deterrent to its widespread use. Subsurface injection of sludge-based fertilizer provides a potential solution to the odor problem.

2. Sludge as Compost

Sewage sludge may be transformed into compost by mixing it with an organic bulking agent, such as woodchips, saw dust, leaves, or straw. Compost differs from fertilizer in that the nutrient content of compost is low. It is therefore considered to be a soil conditioner rather than a fertilizer.

The process of composting takes place in reactor (enclosed) or non-reactor (aerated pile or windrow) systems. Reactor systems process the organic matter in structures such as silos, which protect the material from the elements and also contain odor. While many foreign countries utilize reactor systems, their high cost has limited the number found in the United States. One of the few full-scale sludge reactors in this country is located in Cape May, New Jersey.

Non-reactor systems, such as that located in Middletown Township, New Jersey, use static aerated piles in which aerobic conditions are maintained by blowing or drawing air through the pile. Non-reactor systems also employ windrows which are turned at regular intervals. While reactor systems are more expensive to construct and maintain, they hold the advantage of more reliably producing pathogen-free, non-odorous compost. Regardless of how the compost is processed, its content must be strictly regulated for food-crop or non-food crop uses.

It has been suggested that some the sludge currently generated by New Jersey's ocean dumping sewage authorities may indeed be suitable for such land applications. It has been reported that an analysis of pollutants in the sludge that is routinely ocean dumped was performed for all data reported between September 1985 and September 1987.[7] The analysis revealed that the subject sludge achieved land application limits for most parameters.[8] Although additional parameters must be evaluated to determine the suitability of the sludge for various land applications, it appears that alternative management options for the New Jersey sludge may be more feasible than anticipated. Similar information concerning the New York sludge does not appear to be available.

c. Need for independent analysis

The EPA should undertake an independent analysis of the problems confronting, and the resources available to, the various dumping authorities. In particular, the EPA should seek to determine what alternative sludge disposal options are environmentally desirable, legally sufficient, and practical for each authority, as well as how soon these options can be implemented. Such an analysis is mandatory, because the Act requires that compliance and enforcement agreements contain schedules that, as determined by the Administrator, specify reasonable dates for implementation of alternative disposal methods.[9] Furthermore, the EPA agreements must end the ocean dumping of sewage sludge "at the earliest possible time."[10]

The EPA should ensure that alternative plans give full consideration to emerging technologies for wastewater management and sewage sludge use and disposal, including the use of natural systems for waste management and treatment. We have been informed that inadequate attention has not been given to the development of these systems, which often cost far less than high-technology solutions (such as incinerators, treatment plants), and which hold great promise for producing, in some cases both energy and other useful products such as fertilizer and soil conditioners.

The EPA should encourage the dumpers to devote some portion of their alternate plan to demonstration projects using natural systems, especially those dumpers which contemplate enforcement agreements because they are still in the process of identifying, evaluating and selecting interim and long-term sludge plans.

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[7] Statement of Arnold Schiffman, New Jersey Department of Environmental Protection, before the New Jersey Senate Special Committee to Study Coastal and Ocean Pollution, September 15, 1987, at 7.

[8] Id.

[9] Conference Report at 29; see the Act at Section 104B(c)(2)(B)(i), (3)(B)(i), (4),

[10] 134 Cong. Rec. S16686 (daily ed. Oct. 18, 1988) (statement of Senator Lautenberg).

We suggest EPA initiation of a "roundtable" discussion or several day conference on sludge use and disposal options, (and sludge elimination options) at which the dumping authorities could interact directly with commercial concerns, scientists, engineers, environmentalists, and sewage authorities from across the nation, in order to investigate creative solutions to the sludge use/disposal dilemma. This roundtable should occur as soon as possible.

The dumping authorities should be required to fully detail their proposed plans and should include in their proposals all elements required of compliance and enforcement agreements, including but not limited to, schedules for the phase-out of ocean dumping, the details of interim and final disposal alternatives, schedules for the implementation of these alternatives, and sources and amounts of financing (especially state aid) for the implementation of these alternatives.

One basic element of EPA's assessment will be the identification of those dumping authorities that can potentially meet the December 31, 1991 deadline for termination of ocean dumping. This identification will allow the EPA to determine the type of agreement, either compliance or enforcement, which is appropriate for each authority. Because the authorities may have motives for entering into agreements which are either excessively ambitious or excessively slack, it is important that the EPA independently determine the type of agreement which is viable for each of the parties.

d. Implementation of alternatives during permit period

EPA has accepted the permit applicants findings that "facilities for implementing such alternatives are not immediately available to them." (tentative determination, at 10). We are concerned that the applicants and EPA have not sufficiently explored the possibility of instituting alternatives for some portion of the waste generated, and the possibility of combining a number of different alternatives to meet their needs. The tentative determination is silent on efforts thus far expended to seek and use alternatives, even in a limited way, during the permit period.

e. Reduction of toxics during permit period

Since land based alternatives will require "cleaner" sludge (especially the most environmentally sound alternatives such as composting and direct land application), the permit should include a mandatory schedule of reduction of toxic constituents in each sewage authority's sludge. This requirement could be applied equivalently in all permits in terms of a percent per year reduction, or it could require proportionally greater reductions for the more highly contaminated sludges. The reductions should be feasible but not necessarily comfortable for the permittees to meet. We believe the inclusion of this condition in the permits would better satisfy the intent of the Act than leaving the restrictive discharge rates to "inspire" sewage authorities to clean up the sludge.

3. Impact on aesthetic, recreational and economic values has not been addressed adequately

In addition to a consideration of the question of environmental acceptability, review of a proposed dumping activity involves an evaluation of the effect of the activity on other uses of the ocean. MPRSA requires that EPA establish criteria for reviewing and evaluating proposed dumping activities with regard to the effect on alternate uses of the ocean, such as scientific study, fishing, and other living resource exploitation, and non-living resource exploitation. Based upon that statutory directive, existing ocean dumping regulations include specific standards for evaluation of the impact of the proposed dumping on aesthetic, recreational and economic values and other uses of the ocean (227.17 to 227.22).

These criteria are not satisfied under the proposed permits. Subpart D of the Ocean Dumping Regulations requires that the impact of the dumping on aesthetic, recreational and economic values be evaluated individually with respect to (227.17):

(1) Potential for affecting recreational use and values of ocean waters, inshore waters, beaches, or shorelines; and
(2) Potential for affecting the recreational and commercial values of living marine resources.

Section 227.18 of the ocean dumping regulations sets out with specificity the factors to be considered in this analysis, including, nature and extent of present and potential recreational and commercial use of areas which might be affected by the proposed dumping; existing water quality, and nature and extent of disposal activities in the areas which might be affected by the proposed dumping; visible characteristics of the materials which result in an unacceptable nuisance in recreational areas; presence in the materials of pathogenic organisms that might adversely effect fisheries and shell fisheries; presence in the materials of toxic chemical constituents which may affect human health; presence in the materials of chemical constituents which may bioaccumulate; and presence in the materials of constituents that might significantly affect living marine resources of recreational or commercial value. EPA has not undertaken such an assessment, which is necessary to adequately evaluate the acceptability of the dumping activity.

It is stated in the tentative determination (at 11) that "all observed water quality impacts have been short term, lasting only a few hours." However, the observations are concerned only with single dumping events and do not consider the prolonged effects of dump upon dump upon dump. It is essential that EPA begin viewing this activity as a continuous, fluctuating stream of sewage sludge and not a single-barge event.

The tentative determination states (at 11) that "no agency has promulgated water quality standards for marine waters beyond the territorial limits of the U.S. [Therefore] all applicable marine water quality criteria will be met in the marine environment...." This is a failure of EPA, not a justification for allowing sewage sludge dumping under the conditions of the draft permit.

The tentative determination further states (at 11-12) that "the degree to which large-scale, continuous waste disposal at the DMSDS would contribute to biological tissue concentrations has not been determined. However, biota would not be expected to accumulate contaminants to levels determined to have a direct effects humans as a result of sewage sludge disposal. Thus, waste disposal at the DMSDS is not expected to affect human health through consumption of seafood organisms." The lack of data does not logically lead to the conclusion that there is no effect. EPA should not be using such unsubstantiated arguments as "is not expected to."

NOAA's site characterization indicates that dumping activities may indeed interfere with fisheries. NOAA concludes that "it is clear the "potential area of influence" (PAI) as it extends onto the continental shelf is an important fish production area contributing significantly to the stocks supporting the commercial and recreational fisheries of the adjacent coastal states."[11] Adverse impacts in the PAI could have serious, far-reaching effects on these important fisheries. Since EPA does not have data to determine whether the on-shelf fisheries are or are not impacted by the sewage sludge dumping, it is necessary to restrict dumping activities during periods of on-shelf currents. The permits should contain contingency plans for those oceanographic conditions, as recommended in the 1989 Inspector General's report.[12]

Absent an Environmental Impact Statement (EIS) on the transport and transfer phase of the proposed dumping activity, it is virtually impossible to evaluate other potential risks to aesthetic, recreational and economic values. It is well recognized that the large stretch of the Atlantic shoreline that could be impacted by a spill or short-dumping at sea represent valuable economic resources with regard to both tourism and fisheries. The location of recreational beaches (Atlantic City, New Jersey) only 105 nautical miles from the dump site raises serious concerns about potential impacts. Yet, it appears that no evaluation has been prepared on potential impacts on aesthetic, recreational and economic values resulting from spills or short-dumping along the transportation route.

4. Impact on other uses of the ocean has not been addressed adequately

Subpart E of the Ocean Dumping Act regulations requires that an evaluation be made on an individual basis of the potential effects of the dumping on other uses of the ocean. Section 227.21 enumerates in detail those uses that must be considered. It states:

> An appraisal will be made of the nature and extent of existing and potential uses of the disposal site itself and of any areas which might reasonably be expected to be affected by the proposed dumping, and a quantitative and qualitative evaluation made, where feasible, of the impact of the proposed dumping on each use. The uses considered shall include, but not be limited to:
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> (a) Commercial fishing in open ocean areas;
> (b) Commercial fishing in coastal areas;

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[11] National Marine Fisheries Service, "106-Mile Site Characterization Update," NOAA Technical Memorandum, NMFS-F/NEC-26, August 1983, at vi - vii. (hereafter, "NOAA's 106-Mile Update").

[12] Earnest E. Bradley III, Assistant Inspector General for Audit, EPA's Monitoring at the Deepwater Municipal Sludge Dump Site, Report No. E1HWG9-13-0018-9400024 March 31, 1989.

(c) Commercial fishing in estuarine areas;
(d) Recreational fishing in open ocean areas;
(e) Recreational fishing in coastal areas;
(f) Recreational fishing in estuarine areas;
(g) Recreational use of shorelines and beaches;
(h) Commercial navigation;
(i) Recreational navigation;
(j) Actual or anticipated exploitation of living marine resources;
(k) Actual or anticipated exploitation of non-living resources...; and
(l) Scientific research and study.

It is stated in the tentative determination (at 12) that "the disposal area is not particularly important relative to adjacent ocean areas. Most commercially important species live and spawn above the continental shelf, and consequently that is where most commercial fishing is done." This does not take into account that the plumes spread far outside the disposal site and the fate of the sludge is not known -- this means that it is not known whether it impacts animals on the shelf or not. Furthermore, the red crab fishery is very near the disposal site and could be used as a good indicator of potential impacts on fisheries if relevant data were collected.

The tentative determination states (at 13) that the "assessment of impacts on other uses of the ocean has considered both temporary and long-term effects utilizing state of the art technology." Are we to believe that conjecture based on no data is considered state-of-the-art technology?

NOAA's 106-Mile Update indicates that dumping activities may indeed interfere with fisheries. NOAA concludes that "it is clear the PAI as it extends onto the continental shelf is an important fish production area contributing significantly to the stocks supporting the commercial and recreational fisheries of the adjacent coastal states."[13] As one example, the larval stages of bluefish, the most important recreational fishery on the East Cost, occur in slope waters, including the area of the 106-Mile dumpsite. NOAA states that "it is clear that [bluefish] occupy waters potentially influenced by dumping at the 106-Mile Site during the vulnerable early part of their life cycle."[14]

Figures 2 and 3 graphically demonstrate the proximity of valuable fishing grounds to the dumpsite. Figure 2 shows the distribution of the ~~lobster~~ and red crab fisheries within the PAI, while Figure 3 shows the location of the biologically productive offshore canyons which serve as habitats for a number of commercially important fisheries, including tilefish and lobster. While these areas are depicted as "New Jersey's commercial fishing grounds" and "New Jersey's offshore sportfishing grounds," fishermen from Rhode Island to North Carolina -- and in the case of the sport fishing areas, fishermen from all over the United States -- use these fishing grounds. As such, it is not just the economy of New Jersey, but a much broader sector that is at stake. Adverse impacts in the PAI could have serious, far-reaching effects on these important fisheries.

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[13]. NOAA's 106-Mile Update , at vi - vii.

[14]. Id. at 7-9.

Absent an EIS to provide adequate consideration of these factors, the requirements of Section 227.18 have not been satisfied. The 106-Mile update indicates the value of the big-game fishery in New Jersey alone to be approximately $73 million and emphasized the magnitude and importance of this offshore fishery and the impact any adverse changes in distribution and/or abundance of tunas and billfishes would have on the fishery.[15] Both tuna and billfish are known to frequent the area near the dump site.[16]

The broader impacts of the dumping activity on commercial fisheries within the PAI must be considered. The 106-Mile Update indicates that the tilefish fishery is already under stress (presumably due to fishing pressure) that could be exacerbated by adverse impacts of dumping. Further, NOAA suggests a foreign fishing fleet associated with the PAI worth approximately $8.7 million and notes recent U.S.-foreign joint fishing ventures that could be adversely impacted by waste disposal at the 106-Mile Site.

Clearly, a more careful evaluation is needed of potential impacts on other uses of the ocean based upon sound scientific fact. The preparation of an EIS which includes a more comprehensive evaluation of impacts (including potential impacts along the sea transportation route), and which recognizes scientific uncertainties that currently exist with regard to fate and effect of sludge constituents, would go a long way toward providing the necessary analysis. Given the difficulty of monitoring at the proposed dump site, and the absence of an evaluation of potential effects on aesthetic, recreational, and economic values and other uses of the ocean, the use of the 106-Mile Site for the proposed dumping is inappropriate.

5. The 106-Mile site is unacceptable

The 106-Mile waste disposal site is located approximately 100 miles due east of Cape May, New Jersey just off the continental shelf in waters ranging from 1,500m to 2,750m. Since 1961, this site has been used intermittently by more than 100 different dumpers as a dump site for a wide variety of waste materials.

a. Unique Regional Oceanic Processes

Because of the several different types of water masses that occupy the area throughout the year and the unpredictability of the strength and direction of currents, this area has been described as one of the most hydrographically complex areas in the western Atlantic Ocean.[17] It is this complex water mass structure, however, that provides for a "highly diverse and dynamic biological community" within the 106-Mile Site.[18] The dumpsite is located within continental slope waters, between continental shelf and Gulf Stream waters. Both continental shelf and Gulf Stream waters, however, periodically invade the area, thus complicating the predictability of the distribution and mixing of any waste plumes. Shelf water incursions into the dumpsite area occur predominantly in the spring when fresh water runoff and increased wind causes offshore movement of the shelf waters. Northward meandering of Gulf Stream water and the breaking off of Gulf Stream "warm core eddies" which traverse the dumpsite area are the causes of these water masses occupying the dumpsite.[19]

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[15] NOAA's 106-Mile Update, at xxiv.

[16] Id. at vii.

[17] Bisagni, James J. "Final Report - Long-Term Correlation of Industrial Waste Disposal at the 106 Mile Dumpsite with the Receiving Water Masses: October 1976 Through September 1985." A Report to the Northeast Fisheries Center, NMFS/NOAA, Department of Commerce, December 1985.

[18] NOAA's 106-Mile Update, at xvi.

There are several implications arising from this complex water mass movement. First, the waters of the continental shelf off the East coast of the U.S. are some of the most productive in the world. The National Marine Fisheries Service notes that this area represents the spawning and nursery grounds for some 200 species of fish and no one area can be singled out as insignificant to the reproductive success of some species of fish.[20]

Most fish spawn pelagic eggs during the spring and summer months which drift in the water column until hatching takes place. Upon hatching, the developing larvae are dependent on, among other things, favorable circulation patterns, water quality and food supply. In the spring, when spawning is most intense within the waters of the continental shelf, these waters may move within the dumpsite area and expose the fish eggs and larvae and the plankton upon which they feed to the waste materials. In fact, studies conducted for NOAA indicated that, of all the wastes dumped at the 106-Mile Site over a ten-year period, 18.5 percent were dumped in the more biologically productive shelf water which had displaced the slope water occupying the 106-Mile Site.[21]

Second, Gulf Stream warm core eddies can distribute the waste dumped at the 106-Mile Site over a very wide area. The eddies are clockwise rotating warm core rings which break off of the Gulf Stream and migrate in a west - southwest direction usually from offshore areas off New Jersey to the Outer Banks of North Carolina until they merge back into the Gulf Stream. Recent studies have shown that of the wastes dumped, anywhere from 13.4 percent to 23.5 percent of the wastes were dumped in Gulf Stream warm core rings.[22] These rings are significant for at least two reasons: they have the potential to distribute the waste over a large area; and big game fish, such as swordfish and marlin, tend to follow the edges of the rings. Thus, the potential for damaging these extremely valuable recreational and commercial fisheries is very real.

Although the dumpsite may be located in an area which is relatively remote from human populations, the oceanographic conditions present at this site have led the National

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[19]. Bisagni, supra, note 8 at 3.

[20]. NOAA's 106-Mile Update, at xvi.

[21]. Bisagni, supra, note 3, at 9.

[22]. Bisagni, supra note 3 at 9; See also, Barton, Kenneth W., "Report of Water Masses Receiving Wastes form Ocean Dumping at the 106-mile Dumpsite: October 1, 1985 through September 30, 1986." Data Analysis Product, Report No. 23, March 1987. NMFS/NOAA.

Marine Fisheries Service to estimate that the PAI of the dumped wastes extends over an area off the coasts of New Jersey to North Carolina, encompassing approximately 45,000 mi2. (See Figure 1).

Another complication caused by the physical aspects of the 106-Mile Site is that throughout the year a density gradient called the "pycnocline" stratifies the water column, creating boundaries between layers of waters having different densities. During the summer months when surface waters are the warmest, the pycnocline is most pronounced, and lies at a depth of 20m to 50m. The pycnocline drops to about the 200m level during the winter months. This density gradient has the effect of acting as a barrier which the wastes are usually unable to penetrate. The mixing of such wastes during the summer months is thus confined to the biologically active top 50 meters of the water column, thereby putting at risk the organisms that have spawned during this most active of seasons. Living marine resources are at risk, since both pollutants and the living organisms have a tendency to stabilize just above the pycnocline, thereby exposing themselves to the pollutants.

b. Environmental effects at the 106-mile site

As noted above, adverse environmental effects have been associated with sewage sludge dumping. The dumping of industrial waste at the 106-mile site for many years and more recent dumping of sewage sludge appears to have taken its toll.

Research at the site has shown dumping (primarily of industrial waste) to result in an "unequivocal demonstrated biological response" to copepods, a planktonic crustacean which is as an important link in the oceanic food chain.[23] Specifically, a statistically significant decrease in the copepod Temora stylifera has been found at the site. In addition, two other trends have emerged for which insufficient data is available to make statistical comparisons. These are melanization (blackening) of euphausid gills and depressions in phytoplankton abundance.[24] These trends signify cause for extreme caution in increasing the pollution load at the site.

The importance of phytoplankton to the entire marine ecosystem is stated in the 106-Mile Site Characterization Update (Emphasis added):[25]

> The phytoplankton are often noted as being the basis of aquatic food chains and are, therefore, regarded as an essential component of the fisheries production system. In recent years it has become apparent that contaminants associated with wastes being dumped or discharged into waterways via point and nonpoint sources may affect phytoplankton populations, their productivity, and their relative usefulness within the food webs. Marine scientists therefore believe that the phytoplankton, collectively, are an extremely important

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[23] EPA Region III position paper on Du Pont Permit Application to Review Permit No. II-DE-138-Special, 1987 at 12.

[24] Id.

[25] NOAA's 106-Mile Update, at xvi.

> component of the ecosystem and must be understood prior to implementing new waste disposal activities in marine waters or continuing or increasing waste loading.

The NOAA findings indicate a potentially damaging trend regarding phytoplankton impacts at the 106-Mile Site. Absent a clear understanding of this finding, sludge dumping should not be continued at this site.

Further, a significant increase in moribundity of fish eggs has been detected in the PAI and the frequency of damaged eggs has been found to be high (19.8 percent) in the waste plumes.[26] This finding is particularly disturbing in light of the fact that the waters within the vicinity of the 106-Mile site supports important fisheries, including cod, haddock, menhaden, bluefish, mackerels, silver and other hakes, anchovy and sand lance.[27] As noted by NOAA:

> The fish and shellfish that inhabit the PAI sector of the shelf either as eggs, larvae, juveniles or adults constitute a significant segment of the commercial and recreational fisheries that contribute one billion dollars annually to the economics of the coastal states from Maine to North Carolina.

Clearly, dumping at the site may already have resulted in significant damage to the resources of the marine environment and unacceptable adverse effects on the marine ecosystem, in and around the dump site. Given the adverse impacts on copepods and fish eggs, and the adverse trend with regard to phytoplankton abundance, continued dumping at the site is unacceptable. This is especially true given that "the long term continued use of the site cannot be fully extrapolated due to insufficient information on the value of this planktonic community, especially the icthyoplankton on the population dynamics of the shelf."[28] As noted in NOAA's "106-Mile Site Characterization Update" (Emphasis in original):[29]

> The pelagic ecosystem of the potential area of influence (PAI) within and adjacent to the immediate vicinity of the disposal site location has not been, as yet, subjected to intensive study.

c. The site is not suitable for environmental monitoring

Because of the highly dispersive nature of the ocean in this area, the monitoring of long-term effects will be extremely difficult. NOAA characterizes the site as a "highly dispersive environment where waste contaminants will be mixed effectively and transported in unpredictable ways from points of input."[30] In order to effectively monitor for long-term effects, EPA would be required to monitor an area which for practical purposes is too large to cover on a long-term basis. EPA states in its 1980 Environmental Impact Statement for the designation of the 106-Mile Site that (emphasis added):[31]

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[26] Region III position paper, at 12.

[27] NOAA's 106-Mile Update, at v.

[28] Region III position paper, at 12.

[29] NOAA's 106-Mile Update, at vii.

[30] Id., at xii (Emphasis added).

> under the dynamic conditions at the 106-Mile Site, long-term monitoring will be nearly impossible to measure because affected plants and animals will most likely have moved out of the area, either by swimming or drifting with the water.

Prohibitive costs render the necessary frequency and areal extent of an adequate monitoring effort impossible at this time.

In addition, while any proposed permit for sludge dumping is expected to require that monitoring activities be undertaken at the site to determine any adverse environmental impacts, past industrial waste dumping at the site makes interpretation of results of environmental monitoring in the area difficult. While no industrial waste is currently being dumped at the 106-Mile Site, nearly 30 years of dumping activity, as discussed earlier, has already resulted in damage to the marine environment. Because there is no baseline data prior to the onset of sludge dumping, it will be difficult to determine through monitoring if sludge dumping is causing further damage.

One of the site selection criteria under Section 228.6 of the Ocean Dumping regulations is the feasibility of surveillance and monitoring. Since EPA has been remiss in not collecting baseline environmental data prior to the initiation of sludge dumping at the 106-mile site and has not collected data on biological fates and effects, it cannot be assumed that future monitoring will be able to distinguish environmental impacts due to sludge disposal (without a "before picture", and "after picture" cannot measure change). We are therefore forced to assume that there is a potential negative impact from the sludge.

Given the rather limited likelihood of conducting any meaningful monitoring activities to determine effects of sludge dumping, this activity appears to be inappropriate.

d. EPA's proposed monitoring plan and permit monitoring provisions are inadequate

The proposed permits fail to provide for adequate monitoring of the 106-mile site. We also object to the non-restrictive way in which monitoring and assaying responsibilities are assigned to the permittees. Proposed permit condition 25 (at 15-22) describes the monitoring requirements assigned to the permittee. Laboratory assessments on the sludge include acute bioassay tests, analyses of conventional and non-conventional pollutants in the sewage sludge (both suspended particulate and liquid phases), organic-priority pollutant analyses, quantification of floatable materials, volume of sludge disposed, radioactivity, analyses on settleable solids if they are found.

EPA-approved methodology is required as are written quality assurance plans, but the choice of the laboratory doing the analysis is up to the permittee (subject to EPA approval) and reporting of results to EPA is to be done by the permittee. Considering the variability among analytical labs and the motivation for the sewage authorities to be able to report the lowest possible contaminant concentrations, we believe this is not stringent enough. We recommend the following additions to the permits:

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[31]. Environmental Protection Agency, Environmental Impact Statement for 106-Mile Ocean Waste Disposal Site Designation, February 1980.

(1) EPA should appoint a committee of three or more independent knowledgeable scientists to select a list of analytical laboratories whose procedures and results are considered reliable.

(2) Each permittee would then be required to submit its analytical responsibilities to one of these labs. While the permittee would pay for the laboratory work, the reports would be submitted directly to EPA (as well as to the permittee) by the lab.

The environmental monitoring requirements are even more complicated, since they require oceanographic research capabilities. EPA should have the responsibility of coordinating the monitoring and arranging for the data collection and reporting, with the permittees responsible for paying for the work. The purpose of the field monitoring is to determine if the sludge dumping is having a potential or real adverse effect on the environment. This purpose will be much better satisfied with a well coordinated, well planned monitoring effort. Assigning the various authorities the independent responsibility for some of the monitoring data will not accomplish the purpose.

e. Re-designation of the 106-mile site

We understand that EPA is considering allowing the 106-mile site designation to expire on March 17, 1991, without seeking redesignation. EPA apparently believes that if sludge dumping is to continue after that date it will do so under a court order allowing use of the 106-mile site. However, MPRSA requires that dumping activities take place only in formally designated sites. Nothing in the Act changes that requirement. A court would therefore be without legal authority to allow dumping at the 106-mile site after its designation expires without a re-designation.

For the reasons noted above, we do not support continued use of this site. However, if, based on compliance and enforcement agreements, EPA anticipates a continued need for ocean dumping after March 17, 1991, it is incumbent upon the Agency to seek re-designation of the 106-mile site, or, preferably, designation of a new site.

B. The Proposed Permits Do Not Satisfy the Requirements of Other Applicable Federal Laws

In addition to meeting the requirements of MPRSA, all ocean dumping permit applications must meet the requirements of other applicable federal laws designed to further protect the environment. As the following discussion suggests, the proposed permits fail to meet these requirements.

1. Coastal Zone Management Act

Under the Coastal Zone Management Act (CZMA), 16 USC 1456(c)(3)(a), an applicant for a federal permit whose activities affect land or water uses in the coastal zone of a state with a federally approved management program must provide in the application a certification that the proposed activity complies with and will be conducted in accordance with the state's management program.

The states of New York and New Jersey both have valuable resources to protect in their coastal zones. The potential for an accidental spill of sewage sludge in the coastal zone during transport of the waste to the dumpsite is a significant threat to the states' interests. Yet, the permit applications fail to include consistency findings. Absent such findings, the requirements of the CZMA have not been met and the applications are incomplete. EPA should require consistency findings prior to making a final determination on the permit applications.

2. NEPA

EPA has failed to prepare an environmental impact statement (EIS) for ocean dumping of sludge at the 106-Mile Site, including the transportation of the waste, as required under the National Environmental Policy Act of 1969 (NEPA), as amended, 42 USC 4321 et seq. Under NEPA, an EIS is to be included in every recommendation or report on proposals for legislation and "other major Federal actions" significantly affecting the quality of the human environment (42 USC 102(2)(C)). The issuance of an ocean dumping permit is customarily accompanied by the preparation of an EIS.

EPA can not rely on the 106-Mile Site EIS and NOAA Update as a basis for sludge dumping because those documents do not give consideration to potential environmental risks resulting from environmental impacts of the particular waste sought to be dumped and transportation of the waste 100 miles off the Atlantic Coast. It is critical that a worst case analysis of a catastrophic spill be prepared so that the risks are understood. EPA can then weigh such risks fairly against any potential benefits it might perceive.

The U.S. Supreme Court has stated that an EIS is only the "outward sign that environmental values and consequences have been considered." Andrus v. Sierra Club, 442 U.S. 347, 350 (1979). Ultimately, what NEPA seeks are environmentally better agency decisions. The EIS was not intended by Congress as an end in itself, but rather, as the CEQ regulations state (40 CFR Section 1500(1)(c)):

> The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.

With that broader purpose in mind, preparation of an EIS by EPA would demonstrate the Agency's commitment to NEPA principles.

3. Endangered Species Act

Under the Endangered Species Act (ESA), 16 U.S.C. Section 1631 et seq., every federal agency has an obligation to insure that its actions are not likely to jeopardize the continued existence of any endangered species or destroy or modify its habitat.[32]

A determination that ocean dumping activities at the 106-Mile Site "will not affect any endangered or threatened species" is virtually impossible to make because the impact of the dumping on marine mammals, turtles, and birds is difficult to predict, and the residence times of marine mammals at the site and in the PAI are not well documented. Current knowledge suggests, however, that many species of marine mammals, turtles, and birds, including endangered and threatened species, spend significant parts of their lives in the PAI.

EPA's tentative determination is silent on the issue of endangered species. We can only guess from this silence that the requirements of the ESA have not been met.

As noted in the 106-Mile Site Characterization Update,[33] species of marine mammals recorded in the PAI throughout the year include: bottlenosed dolphin, Tursiops truncatus; grampus, Grampus griseus; pilot whales, Globicephala spp.; sperm whale, Physeter macrocephalus; minke whale, Balaenoptera acutorostrata; and fin whale, B. physalus. Spotted dolphins, Stenella spp.; white-sided dolphin, Lagenorhynchus acutus; sei whale, B. borealis; humpback whale, Megaptera novaeangliae; and beaked whales (Ziphiidae) were found seasonally. Humpback, fin, sei, and sperm whales are endangered species. Loggerhead turtles, Caretta caretta, which are threatened species, and leatherback turtles, Dermochelys coriacea, which are endangered, were also found in the area. In addition, a total of 27 species of seabirds have been recorded in the PAI.

The estimated incidence of all endangered whales in the North Atlantic is over 3400 in the spring and summer months, over 1700 in the winter, and over 800 in the fall.[34] Threatened loggerhead sea turtles are most abundant in the summer when the population is estimated at an impressive 10,912.[35] An estimated 2000 loggerheads are present in the spring and fall as well.[36]

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[32] Section 7(a)(2) of the ESA provides that (16 U.S.C. 1536 (a)(2):

> Each Federal agency shall, in consultation with and with the assistance of the Secretary [of Commerce or Interior], insure that any action authorized, funded or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species....In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available.

[33] NOAA's 106-Mile Site Update, at xxvii - xxviii.

[34] EPA, Marine Operations Division, Office of Marine and Estuarine Protection, "Assessment of the Impact of Incineration of Chemical Wastes in the Proposed North Atlantic Incineration Site on Endangered and Threatened Species," July 9, 1985, at 41, 43, 45, 47, 49 and 52.

[35] Id., at 36.

As noted in the 106-Mile Site Characterization Update:[37]

> Sightings of cetacean and turtle species suggest considerable movement into and out of the 106-mile site's PAI seasonally. Although several species can be seen in the area throughout the year, individual residence times could not be determined from available data.

No efforts have been made to determine the potential impact of sewage sludge dumping on marine mammals, turtles and birds. However, NOAA's 106-Mile Site Characterization Update suggests the potential for impaired breeding performance or adverse impacts on long-term survival resulting from direct physical contact or contamination of food sources (food chain related effects).[38] However, NOAA has suggested that "[a] better understanding of food habits in relation to prey availability is needed for a thorough evaluation of residence time and food chain related effects caused by excessive burdens of pollutants from dumping."[39]

EPA's Final Environmental Impact Statement (EIS) for the 106-Mile Site [40] noted the presence at the site of a range of whales and turtles, some of which are rare or endangered, but stated that "... disposal activities at the 106-Mile Site would not obstruct migrations nor harm these animals in any foreseeable way since, as migrants, they would only be in the site a few hours, at most, and would tend to avoid dump vessels."

The lack of information concerning residence times in the PAI and the 106-Mile Site itself suggests that the assumption that these animals merely use the PAI for migratory purposes is speculative at best. Indeed, new evidence suggests that the Mid Atlantic region "may be an area of considerable importance to the life cycle of the sperm whale."[41]

In sum, absent adequate data about the residence time of marine mammals, turtles, and seabirds in the PAI, and in light of the uncertainties about potential impacts of sludge dumping on these creatures, a determination that the proposed dumping activity will have no impact on endangered species in the area is clearly erroneous. Issuance of the proposed permits would therefore violate the ESA.

It is therefore critical that the appropriate regional office of the National Marine Fisheries Service and the Fish and Wildlife Service prepare biological opinions for assessing the proposed permits.

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[37] NOAA's 106-Mile Update, at xxviii.

[38] Id., at 11-19.

[39] Id.

[40] Environmental Protection Agency, "Final Environmental Impact Statement (EIS) for 106-Mile Ocean Waste Disposal Site Designation," February 1980, at 3-7.

[41] McKenzie, Tracey, and John Nicolas, "Cetaceans, Pinipeds and Sea Turtles," Draft, NMFS, Northeast Fisheries Center, Habitat Conservation Branch, 1985.

4. Clean Water Act

Section 104B(e)(2)(B)(ii) of the Act provides specifically for improvements in pretreatment techniques to facilitate the implementation of disposal alternatives. As noted above, pretreatment serves to mitigate the hazardous character of sewage sludge. Reducing the toxicity of sludge will provide benefits at all stages of sludge disposal; minimizing adverse effects on the marine environment from ocean dumping; and facilitating beneficial reuse of sludge through alternative disposal methods. Therefore, both the ocean dumping permits, as well as the enforcement and compliance agreements should require that dumping authorities undertake programs to establish and enforce strict pretreatment standards for industrial sewage discharges.

The Clean Water Act, 33 U.S.C. 1251 et seq. (CWA) imposes on the EPA certain regulatory responsibilities regarding sludge content which are primary to its duties concerning use or disposal (under the MPRSA). Section 1317(b) of the Clean Water Act and the regulations promulgated thereunder establish requirements that industries and commercial enterprises must treat their waste waters on site before discharging them into municipal sewage systems. See 33 U.S.C. 1317(b),(d); 40 C.F.R. Part 403. The purpose of these so-called "pretreatment" requirements is to protect sewage treatment plants and the environment by preventing the introduction of industrial wastes that might interfere with treatment plant operations, pass through the plant untreated, or contaminate sewage sludge. 40 C.F.R. 403.2.

In addition to these general pretreatment regulations, EPA also has established national standards for certain categories of industries that are significant sources of toxic pollutants (See 40 C.F.R. 403.6). Those categorical standards set nationally applicable limits on the discharge of toxic pollutants, on an industry-by-industry basis.

In certain instances, a sewage treatment plant may experience operational problems -- including sludge disposal problems -- due to industrial discharges not adequately controlled by either the general pretreatment regulations or the national categorical standards. In such instances, the treatment works must develop its own limitations (termed "local limits") on these harmful discharges to address the problems caused by the industrial discharges (whether a category of dischargers or an individual industrial discharger). 40 C.F.R. 403.5(c). Sewage treatment plants must impose these local limits if national categorical regulations are insufficient to prevent pass-through or interference, or if problems are caused by "non-categorical" industries that are not yet regulated by federal standards.

Local limits should be an integral part of the overall strategy for addressing New York and New Jersey's sludge disposal dilemma. For example, due to New York City's failure to set appropriate local limits, the City's sludge is contaminated with up to three thousand pounds of toxic metals each day. These toxic contaminants make it much more difficult to identify environmentally safe land-based alternatives to ocean dumping -- in addition to contaminating the ocean at and around the 106-mile site. Thus, the establishment of acceptable local limits must be a condition to any acceptable compliance or enforcement agreement.

The content of the sludge must also be regulated through the establishment of strict numerical limitations for certain toxic pollutants. Section 1345(d) of the Clean Water Act states in pertinent part:

> . . . the Administrator shall identify those toxic pollutants which, on the basis of available information on their toxicity, persistence, concentration, mobility, or potential for exposure, may be present in sewage sludge in concentrations which may adversely affect public health or the environment, and propose regulations specifying acceptable management practices for sewage sludge containing each such toxic pollutant and establishing numerical limitations for each such pollutant . . . .
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> * * *
>
> Prior to the promulgation of the regulations [described above], the Administrator shall impose conditions in permits issued to publicly owned treatment works under section 1342 of this title or take such other measures as the Administrator deems appropriate to protect public health and the environment from any adverse effects which may occur from toxic pollutants in sewage sludge.

33 U.S.C. 1345(d)(2)(A)(i) and (4) (emphasis added.). It is clear from this section that it is the duty of the EPA to establish numerical concentration limits for toxic pollutants in sewage sludge. Pending issuance of the regulations establishing those limits, the Clean Water Act requires the Administrator to use permits or any other appropriate means to "protect public health and the environment."

EPA has made the decision not to issue national numerical concentration limits for toxics in sludge that is ocean dumped, reasoning that ocean dumping is being phased out and that national regulations therefore are not appropriate. This decision does not relieve EPA of its duty to take interim measures to protect human health and the environment -- in this case, the ocean environment -- against any adverse effects of toxics in sludge.

It is our view that the appropriate measure for the administrator to take is to regulate the quality of ocean dumped sludge by setting specific numerical concentration limits in the MPRSA permit, and in the compliance and enforcement agreements to which EPA will be a party.

Concentration limits for toxics in sludge are needed in the MPRSA permits to protect the ocean today. Concentration limits are needed in the compliance or enforcement agreements to ensure that, over time, sludge quality improves to the degree necessary to enable the ocean dumping municipalities to employ, with applicable restrictions, composting or land application. It might be appropriate for these limits to be phased in, growing more stringent over time, until their sludge is uncontaminated enough to meet land-based disposal limits.

The purposes of the MPRSA and the Act can best be achieved if the EPA approaches each sludge dumping permit application and compliance and enforcement agreement as an opportunity to implement a comprehensive program that achieves the State's and EPA's regulatory responsibilities under the CWA as well as the MPRSA.

The CWA requirements should work hand in hand with those of the MPRSA. The MPRSA and Clean Water Act permitting processes also should work hand in hand in New York City. Thus, the NPDES permits can and should be used as the regulatory vehicles for ensuring both the quality of sludge needed to protect the ocean and move to land-based alternatives, and the pretreatment program improvements needed to obtain that sludge quality.

C. The Proposed Permit Requirements are Inadequate

The EPA relies on a number of limitations and restrictions in the proposed permits to ensure environmental protection. While a number of these restrictions do indeed contribute to that end, others fall short of what might be required.

1. Discharge rates are inadequate to protect the environment

As noted above in Part III(A)(1)(c), above, EPA is not justified in its reliance on discharge rates as a primary means for achieving environmental protection. However, if the Agency insists on continued use of this method, the more restrictive rates in the proposed permits are preferred to existing rates.

2. Discharge procedures are inadequate

The dumping procedures specified in the tentative determination (at 11-15) raise questions about synergistic effects of more than one dump. Each sludge dumping vessel will follow the same track and will be spaced by five hours. Since individual dumps will take more than 5 hours and anywhere up to three days to complete, it is necessary to assume that dumping plumes will overlap each other -- both plumes from the same barge and plumes from several barges in the site at the same time. Nowhere has the additive impact of these plumes been adequately assessed, so it is not clear whether the five hour interval between barges is justifiable.

3. Compliance and enforcement agreements should be incorporated into the permit

As noted above in Part II, compliance and enforcement agreements should be incorporated into the proposed permits, so that a violation of that agreement also constitutes a violation of the dumping permit. At minimum, the proposed permits should include a schedule for phasing out ocean disposal of sewage sludge by December 31, 1991.

4. Chemical and biological analysis requirements are inadequate

As noted above in Part III, above, the chemical and biological analyses requirements specified in the permit are inadequate. The chemical characterization data submitted by the permittees should be confirmed by EPA if they are to be used to recalculate sludge discharge rates. The bioassays should include tests for chronic sublethal effects and bioaccumulation. Bioassays should be conducted on species characteristic of the disposal site, sensitive life history stages, and fishery species that may be subject to the effects of sewage sludge dumping.

5. Function and authority of investigators should be strengthened

Condition 27 of the proposed permits requires the permittee to maintain inspectors and to have one or more present for the transfer of waste at dock side. If a transfer of the waste is to occur at a point other than the dock, the waste transporter, rather than the permittee, is required to provide an independent inspector, approved by EPA and/or the Coast Guard, to observe and record the transfer operation.

While we support the use of inspectors for this purpose, we believe that it is critical that all such inspectors be impartial. Impartiality can best be achieved if EPA draws up a list of approved inspectors and makes assignments for each transfer. The permittee should retain responsibility for payment of the inspectors. However, the inspectors should report directly to EPA.

We therefore disagree with EPA's allowing an inspector to be an employee of the permittee as provided in Attachment No. 2 of the proposed permit, "Responsibilities and Duties of Inspection Personnel." We also believe that each inspector should be personally trained by EPA, rather than allowing an inspector to function as such if his or her supervisor has been thus trained. Given that inspectors must be able to identify violations of the permits, and EPA is the Agency responsible for issuing the permits, then EPA, not the Coast Guard, should be providing the inspectors with training.

6. Function and authority of shipriders should be strengthened

We support the requirement that a shiprider be on board waste transport vessels as provided in Condition 29 of the proposed permits. We do not believe, however, that the Regional Administrator should have the discretion to waive this requirement. Further, as with inspectors, we believe an assurance of impartiality must be provided by drawing up an EPA-approved list of shipriders which are assigned by EPA to each voyage. Again, the permittee would be responsible for compensating the shiprider, but the shiprider would be accountable directly to EPA. Shipriders should have the authority to order the termination of dumping activities in the event of any permit violation or other event associated with dumping activities that might endanger the marine environment or human health

7. Surveillance methods should be improved

In addition to strengthening the surveillance role of shipriders, less subjective means are available for overseeing the dumping activities. We understand that preliminary discussions have taken place between representatives from EPA, NOAA and the Coast Guard to consider the use of satellites for monitoring environmental parameters at the dump site and to provide more effective surveillance. Such a system would use remote capabilities transmitted in a real time basis by satellite. The satellite would pick up data from sensors installed on the vessels and would feed that data back to a shore facility. The transmitted data would enable enforcement authorities to determine immediately if discharges were occurring outside of the designated site, and to determine the rate of discharge. Such a system would greatly enhance enforcement capabilities.

In addition, the satellite could identify the existence of warm core eddies in the area of the 106-Mile Site (mentioned above), that might circulate sludge materials onto the shelf or near shore. Dumping activities could be suspended pending the dissipation of those eddies as a mitigation measure.

Although the Coast Guard is making a good start by equipping the sludge dumping vessels with black boxes to monitor location, this is only a first step. A satellite approach such as that described above offers the distinct advantage of identifying a permit violation immediately upon its occurring. Thus it provides an opportunity for intervention to terminate illegal dumping operations.

The same satellite data gathering system could also be used to conduct environmental monitoring of the site, as part of a full scale monitoring program. Environmental monitoring is critical to ensure that dumping is terminated at the first sign of adverse environmental impacts.

8. Modification or revocation of permits

We support proposed permit condition 6 concerning the grounds for revocation and modification of permits, especially the provision for revocation or modification based upon a "change in any condition or material fact upon which the permit is based...including... changes in conditions at the designated dump site and newly discovered scientific data to the issuing of this permit."

9. Suspension of permits

Condition 7 of the draft permit should be changed to read:

> This permit shall be subject to suspension by the EPA Regional Administrator or his delegate if he determines that imminent or substantial harm to human health or welfare or the marine environment have occurred within the area of impact of sludge dumping at the 106-mile site that could potentially be caused by the sludge dumping.

Absent this change this condition has no meaning, since it is virtually impossible to draw a direct link between the sludge dumping and environmental effects at the site. This is especially true in light of the fact that there is no adequate baseline for the site, nor have there been sound environmental monitoring efforts.

* * *

In sum, EPA's proposed permits for ocean dumping of sewage sludge fail to meet the requirements of the MPRSA, as well as other federal laws. Further, the proposed permits are deficient in the limitations and conditions placed upon dumping activities.

We are greatly disappointed that the issuance of the proposed permits fails to satisfy the letter and the spirit of the Ocean Dumping Ban Act of 1988. Thus far, EPA has failed to use its authority under the Act. We have strongly urged the Agency to aggressively exercise that authority by strengthening the proposed permits in the ways we have suggested and by incorporating the compliance and enforcement agreements in these permits.

IV. The Status of Plans for Monitoring for Impacts of Sludge Disposal

The proposed permits include a potentially powerful tool for protecting against adverse environmental effects -- the condition that permits can be suspended or revoked by EPA on the basis of monitoring results which indicate that unacceptable harm to the environment has occurred as a consequence of sludge dumping. Unfortunately, the tool is defective for the following reasons:

(1) EPA has yet to develop an effective monitoring plan that will be able to detect such harm;

(2) since there has been no baseline monitoring, even with the best possible monitoring henceforth, it will be difficult to specifically link sludge dumping to environmental changes (consequently we recommended in a previous section deleting the requirement that such a link be provable); and

(3) the interpretation of "unacceptable harm" is left up to EPA, and the responsible officials of that agency have demonstrated time and time again that they are not interested in finding out if there are any environmental impacts resulting from the sludge dumping at the 106-Mile Site.

A. EPA Inspector General's Report on Monitoring at the 106-Mile Site Raises Valid Concerns.

The EPA's Office of Inspector General was recently especially critical of the failure of EPA Region II's monitoring plan to look at the cumulative effects of the sludge dumping on the marine environment. EPA Region II should revise its monitoring plan to include the Inspector General's Recommendations. In particular, the monitoring plan must identify the ultimate fate of the sewage sludge, whether it be the bottom of the 106-mile site, the nearby continental shelf, or the farthest reach of the Gulf Stream.

We are in general agreement with the findings of the Inspector General report on monitoring at the 106-mile site. The report reminds us that EPA Region II is responsible for assuring that "dumping activities and the site itself continue to meet the ocean dumping and site designation criteria," which are specified in the Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972. To date, they have not fulfilled that responsibility.

The Inspector General finds and we concur that "[s]cientists are concerned about the progress of monitoring at the 106-mile municipal sludge dump site." Scientists interviewed for the report raised concerns as to "(1) whether monitoring should have been accelerated; (2) whether what is being done now should have been done years ago; (3) whether much of the data being gathered is duplicative and unnecessary; and (4) why after more than two years and two million dollars, the Agency has still not begun to look at cumulative effects of the dumping." In addition, the report faults EPA for a lack of "coordination of research results, information and equipment throughout the scientific community."

We wish to iterate those concerns and add a few others.

(1) No baseline biological and chemical data was collected prior to the initiation of sewage sludge dumping at the site, so determining effects caused by dumping may be next to impossible; in fact, site designation should not have occurred without such baseline studies.

(2) Field "monitoring" to date has consisted of measurements to determine circulation patterns in the vicinity of the dump site and a few measurements to try to determine validity of plume dispersal models; but this is research that should have been done before the site was ever used -- it is not data that demonstrates whether the ecosystem is being changed.

(3) EPA is basing its chemical monitoring on the requirement that the LPC's (limiting permissible concentrations, determined by bioassays on organisms not characteristic of the 106-mile site) be met at the site boundary, after allowing four hours for mixing following the dumping; there are three problems with this:

(a) the question of what is happening within the site boundaries is left open and unregulated;

(b) the four-hour mixing period needs to be reevaluated; and

(c) there will be several barges dumping simultaneously (especially with the new discharge rates specified in the proposed permits, which track barges along the same path at 5 hour intervals), so it will be difficult to monitor at the right place at the right times.

How does EPA propose to monitor the concentrations at the site boundaries, and how will the effects of overlapping plumes be addressed?

(4) There is no provision in the monitoring plan for determining (through laboratory and/or field experiments) the potential for bioaccumulation, chronic biological effects, and synergistic effects with other sources of pollutants.

(5) There is no provision in the monitoring plan for determining the cumulative effects of the total amount of toxic material discharged at the 106-mile site.

(6) There is no provision in the monitoring plan for specifically measuring the effects of the sewage sludge dumping on fisheries species in areas of potential impact.

(7) There is no provision in the monitoring plan for determining the effects of nutrient loading on phytoplankton and bacteria (including pathogens).

(8) The whole rationale upon which the monitoring plan is based is faulty, as is discussed in detail below (at B).

The Inspector General report rightfully finds fault with the tiered approach to monitoring. The four tiers as described do not logically follow one another but are categories of research and monitoring that should be conducted simultaneously.

Tier 1 (waste characteristics and disposal operations) is required throughout the entire period of ocean dumping because permits and enforcement rely upon that data. Contrary to a comment attributed to EPA Region II Water Management Division Director (at 12 in the Inspector General report), Tier 1 monitoring will not tell us anything about the actual direct environmental effects of sludge dumping.

Tier 2 (nearfield fate and short-term effects) is research that has begun and will have to continue as the disposal conditions continue. For example, with multiple dumps occurring simultaneously, it will be essential to study the interaction of the plumes from the various barges in the site area. There is still a dearth of data on short-term biological effects and this needs to be corrected immediately.

Tier 3 (farfield fate) includes research that should have been completed before the site was designated and, failing that, before sludge dumping began. Where does the sludge end up? This one needs to know if one is ever to assess the impact it is having. Yet this research has only just begun, and EPA does not have a clear plan of all the measurements that need to be made.

Tier 4 (long-term effects) is again seen by EPA as a procedure for the future -- or maybe EPA will decide it is not needed at all (see discussion of rationale at B below). But the long-term biological consequences of sludge disposal are exactly what all the concern is about. It is a concern for this that prompted Congress to pass the Ocean Dumping Ban Act, and it is the biological community that Congress and the public want to be assured is not being damaged or contaminated by the dumping that will continue for the next several years. The monitoring (actual field measurements) required in this tier should have begun with baseline data collected before the sludge dumping commenced and should have been continued during every year of dumping activities. Only through a time series of field measurements which lead to an analysis of changes in the ecosystem can the true impact of sludge dumping be assessed. That is the real meaning of the term "monitoring." Yet EPA, it seems, does not feel that this monitoring needs to be done with any haste. Apparently it is simpler to just measure the rate of plume disposal ad infinitum.

The Inspector General report faults EPA for not developing contingency plans for dealing with adverse conditions such as periods of on-shelf currents or catastrophic environmental impacts. We agree that this is a serious oversight and are not satisfied with the answer we have received from EPA -- that sludge disposal must go on, because temporarily dispensing operations would result in an unwieldy backlog of sludge. Once again, convenience seems to take precedence over the environment. We believe careful forethought and planning could reduce both inconvenience and environmental impact.

The finding in the Inspector General report that no action had been taken on altering discharge rates has by now been answered by the revised rates (now much slower) specified in the proposed permits. However, as stated before, we do not believe that the discharge rates alone can be used to diminish the environmental impact. For many of the organisms living in the area of impact, that may be no better than giving them a choice between quick death and long protracted death. The only reason for choosing the latter would be the hope that in the intervening time someone would show up to rescue them. That is just what we hope Congress will do, through its oversight role. It is imperative that Congress demand a responsible assessment of all impacts of the sludge dumping, including long-term cumulative effects, and that provisions for minimizing those effects be included in the permits.

B. The Rationale Upon Which the Monitoring Plan is Based is Faulty

The tiered approach to monitoring as adopted by EPA is to be implemented in a sequential fashion driven by a binary system of questions and actions in which monitoring results are used to make decisions about further monitoring, permitting and site designation. Figure 4 is a diagram of this system as presented by EPA in the Workshop Materials for the Ocean Dumping Workshop, 106-Mile Site, held March 28-30, 1989. Superimposed on the diagram are six points, indicated by starred numbers (*1 - *6), at which we feel the line of reasoning is defective. The following discussions elaborate our concerns with each item:

1. It should be determined if the LPC's are being met, whether the permit and management requirements are met or not!

2. A "no" answer to the question of whether permit conditions can be revised so that LPC's are met should lead to an immediate suspension of the permit until it can be determined beyond doubt that there is no negative impact on the environment resulting from the dumping at the 106-Mile Site.

3. The question ("Are impacts of ocean dumping less than for all other alternatives") is not in accordance with the law, which prohibits dumping if it is causing unacceptable impacts, regardless of alternatives.

4. The EPA monitoring plan offers no way to answer the question posed here about bioaccumulation and synergistic effects. Is it likely that no answer will lead EPA to conclude that none of the next steps need to be taken?

5. The type of monitoring described in both choices at this point should have been undertaken as a first step, not a last step. It is already too late to get the necessary baseline data, and it is necessary to have several years of seasonal data to determine of significant change is occurring.

6. Since monitoring is not being approached in a way to answer the question as stated ("Is there evidence of long-term impacts?"), the question must be changed to read, "Is there evidence of degraded environmental conditions or a stressed marine community in the area of impact of the 106-Mile Site?" Since the direct link to sludge dumping cannot be proven with the proposed monitoring, it is not reasonable to require proof of that link.

C. Monitoring Workshop for Ocean Disposal of Sewage Sludge at the 106-Mile Site.

On March 28 - 30, 1989, EPA held a workshop on the environmental monitoring plan for the 106-Mile Site. Many (in the vicinity of 100) invited scientists and managers attended to discuss, comment upon and recommend changes in the proposed monitoring plan. A handful of representatives of environmental groups were also invited to participate, including the Oceanic Society. On the basis of our participation in that workshop, we have several comments to make about proceedings and EPA's subsequent representation of those proceedings.

1. This workshop should have been convened before sludge disposal began.

Nearly three years after the commencement of sludge disposal at the 106-Mile Site, EPA puts forth a draft monitoring plan for comments and recommendations by scientific and technical experts and others involved in sewage sludge disposal activities at the site. This is much to late, since any monitoring plan begun this late will be seriously defective for reasons already outlined. It was clear in the Inspector General report that knowledgeable scientists and experts from other agencies were not consulted for early input into the development of the monitoring plan. The March workshop was an important move to incorporate the ideas of highly qualified scientists, however, it does not negate the fact that adequate plans should have been developed sooner and should be now be well into the process of implementation. Instead, we are still debating how monitoring should be conducted!

2. EPA has misrepresented the results of the workshop

Many experts from academia, governmental agencies, private research institutions, etc. spent three long days trying to deal with the problems of monitoring at the 106-Mile Site and trying to propose meaningful and effective solutions to those problems. The results have been summarized in reports prepared by working group chairmen and strategy planning groups. These reports have been circulated to the workshop participants and contain numerous recommendations and discussions related to the complex issues surrounding monitoring at the Site.

The press releases and other public statements that EPA has made about the outcome of the workshop include false generalizations that are misleading to the public and insulting to the workshop participants. For example, the press briefing following the workshop included the following misleading statements:

- o There is no evidence from existing studies that dumping of sewage sludge at the 106-Mile Site poses a threat to human health, either directly or indirectly through the consumption of seafood.

- o Existing studies have found no measurable effects on living resources that have been related to dumping at the 106-Mile Site.

- o Based on existing studies, sludge is unlikely to move onto the shelf or onto beaches.

The first two statements are misleading because there are no studies to indicate one way or the other whether there have been such effects. The third statement is simply false, since it has been shown that currents can carry sewage sludge plumes onto the shelf about 20% of the time.

Some EPA officials have publicly whittled down the workshop results to a simple statement that there was a consensus among the participants that sludge dumping at the 106-Mile Site posed no significant threat to public health and the marine environment.

Nothing could be further from the truth. There was consensus that there exists no information (data) on which to base a judgement as to whether sludge dumping is having a negative impact on the environment. Many of the participants expressed the belief that there is the potential for environmental degradation and impacts on marine resources and human health and that it is essential that monitoring be conducted in such a way as to try to legitimately answer the question of impact.

We are particularly upset at the cavalier way in which EPA has handled the findings of the workshop in public. It is irresponsible actions like this that lead members of the scientific community to be unwilling to spend time cooperating with and advising lawmakers, regulators and managers. We badly need the input of our most knowledgeable scientific and technical experts if we are to hope to do an adequate job of protecting the environment. EPA of all agencies should be sensitive to this.

3. The results of the monitoring workshop must be incorporated into the final monitoring plan.

The unedited reports of the working group chairpersons and strategists have been circulated by Battelle[42] to the workshop participants and should be carefully scrutinized by members of the subcommittees. It is essential that the concerns and recommendations which are detailed it the reports be incorporated into the final monitoring plan as much as possible. We hope Congress will use its oversight powers to ensure that this is done.

V. Conclusion

In conclusion, thus far, EPA has been unsuccessful in carrying out the requirements of the Act by its failure to achieve significant progress toward compliance and enforcement agreements with the ocean dumpers, by its failure to ensure adequate public participation as required under the Act, and by its failure to properly consider existing permit applications with regard to applicable federal law. In addition, implementation of the Act has been hampered by the failure of the municipalities to develop adequate and justifiable phase-out plans.

We look forward to working with members of the Subcommittees to assist EPA in it compliance with the Ocean Dumping Ban Act of 1988. Much depends on successful implementation of the Act -- the health of the marine ecosystem and the welfare of those who depend upon that ecosystem for their livelihood.

---

[42] Memo from Carlton D Hunt of Battelle to 106-Mile Site Workshop Participants, April 10, 1989.

Explanatory Notes for Tables I and II

Constituents of New York City Sewage Sludge

The attached tables list estimates of annual quantities of hazardous materials contained in sewage sludge from the New York sewage treatment plants (in our view grossly underestimated) dumped at the 106-mile site. The quantities were derived from analyses presented in New York City's 1987 application for a dumping permit from EPA and in the City's response to EPA's comments on the application. We believe the quantities measured underestimate what is actually present in the sludge for the following reasons:

(a) The heavy metals (arsenic through Zinc in the tables) were measured in the total sludge which was defined in the application as the liquid phase plus suspended solids (particles that do not sink). The solids which sink were not included in the analyses even though the solid phases are likely to contain a much larger proportion of hazardous materials than the pure liquid phase. It is not known what proportion of the sewage sludge is solids which settle out, but estimates of 1% to 8% are offered in general descriptions of municipal sewage sludge.

(b) The additional hazardous materials assessed (including several organics, heavy metals and inorganic nonmetals) were measured only in the pure liquid phase. All solids were omitted from those analyses, so the magnitude of the error could be very large in light of the fact that many of these materials are found preferentially or exclusively associated with particulates.

Table I
(see attached notes)

The Oceanic Society
Chemical Analyses of New York City Sewage Sludge (**)
Amounts Dumped (Kg/yr) - 1986 (***)

	26th Ward	Bowery Bay	Coney Island	Hunts Point	Owls Head	Rock-away	Tallman Island	Wards Island	Newton Creek	Total
Arsenic	389.28	237.13	70.64	180.60	136.77	20.14	101.98	422.20	480.42	2,039.17
Cadmium	499.85	416.41	38.11	266.03	247.65	11.96	212.92	232.45	2,725.02	4,650.39
Chromium	17,324.17	22,653.84	1,184.88	6,688.74	2,536.65	229.29	3,399.34	14,547.87	38,954.58	107,519.36
Copper	37,501.73	31,006.43	5,706.64	18,029.20	9,518.97	2,847.25	8,865.84	45,303.95	58,982.57	217,762.58
Lead	10,904.04	7,863.65	2,593.93	5,259.78	6,250.09	409.24	2,503.57	15,022.25	47,027.24	97,833.79
Mercury	45.86	51.36	17.48	31.62	21.71	3.77	21.59	70.37	104.11	367.85
Nickel	3,704.31	2,375.39	653.29	1,623.54	1,132.34	57.18	3,904.65	1,660.35	8,633.42	23,744.47
Vanadium	377.06	395.22	119.77	346.60	253.66	20.90	158.48	830.18	855.84	3,357.71
Zinc	39,590.82	54,149.20	6,366.33	18,242.02	14,121.55	1,721.12	7,832.26	27,514.44	71,599.63	241,137.38
Arsenic(pentavalent)	*		*	*	*			*	*	
Arsenic(trivalent)	*		*	*	*			*	*	
Chlorine residual	917.16		*	182.42	*			*	*	1,099.58
4-Chlorophenol	*		*	*	*			*	*	
Chlorpyrifos									*	
Chromium(trivalent)	3.57		0.32	5.78	51.26			1.66	773.35	835.93
Cyanide			28.82	*	2.62			276.73	70.58	378.75
Demeton										
Guthion										
N-nitrosodibutylamine	*		*	*	*			*	*	
N-Nitrosodiethylamine	*		*	*	*			*	*	
N-Nitrosopyrrolidine	*		*	*	*			*	*	
Pentachlorinated ethanes	*		*	*	*			*	*	
N-sulfide	101.91		10.25	243.23	104.60			379.51	238.22	1,077.72
2,3,5,6 tetrachlorophenol	*		*	*	*			*	*	
Thallium	*		*	*	*			*	*	
Antimony	*		*	*	*			*	*	
Beryllium	*		*	*	*			*	*	
Phenols	61.14		7.69	45.61	54.92			616.70	286.75	1,072.81

(*) below detection limits

(**) Quantities derived, by the Oceanic Society, from data in "Special Permit Application for the Disposal of Sewage Sludge from Fourteen New York City Water Pollution Control Plants at the Deepwater Municipal Sludge Dump Site" submitted to EPA by the New York City Department of Environmental Protection in January, 1987 and the "Response to EPA's Comments" on that document, submitted January, 1988.

(***) for pounds per year, multiply by 2.2

Table II
(see attached notes)

The Oceanic Society
Chemical Analyses of New York City Sewage Sludge (**)
Amounts Dumped (Kg/yr) - 1987 (***)

	26th Ward	Bowery Bay	Coney Island	Hunts Point	Owls Head	Rock-away	Tallman Island	Wards Island	Newton Creek	Port Richmond	North River	Red Hook	Total
Arsenic	423.54	300.40	115.34	164.52	166.58	23.87	106.38	286.46	439.44	12.89	116.25	9.41	2,165.09
Cadmium	543.84	527.50	62.22	242.35	301.62	14.17	222.10	157.72	2,492.59	6.61	193.58	15.68	4,779.99
Chromium	18,848.83	28,697.85	1,934.58	6,093.38	3,089.46	271.66	3,545.97	9,870.61	68,438.37	70.05	5,258.98	425.91	146,545.64
Copper	40,802.17	39,278.89	9,317.35	16,424.42	11,593.42	3,373.44	9,248.28	30,738.38	53,951.71	644.47	11,088.83	898.05	227,359.41
Lead	11,863.67	9,961.66	4,235.16	4,791.61	7,612.16	484.87	2,611.56	10,192.48	43,016.10	400.69	4,618.90	374.07	100,162.94
Mercury	49.89	65.03	28.55	28.81	26.44	4.47	22.52	47.74	95.23	1.91	21.42	1.73	393.74
Nickel	4,030.32	3,009.14	1,066.63	1,479.03	1,379.11	67.74	4,073.08	1,126.54	7,897.05	58.98	14,496.78	1,174.05	39,858.46
Vanadium	410.24	500.66	195.55	315.75	308.95	24.76	165.32	563.27	782.84	13.59	179.91	14.57	3,475.41
Zinc	43,075.12	68,596.12	10,394.44	16,618.30	17,199.03	2,039.20	8,170.11	18,668.34	65,492.61	844.81	12,005.69	972.30	264,076.07
Arsenic(pentavalent)	*		*	*	*			*	*				
Arsenic(trivalent)	*		*	*	*			*	*				
Chlorine residual	443.50		*	166.18	*			*	*				609.68
4-Chlorophenol	*		*	*	*			*	*				
Chlorpyrifos													
Chromium(trivalent)	3.88		0.52	5.26	62.43			11.27	707.38				790.74
Cyanide			47.06	*	3.19			1,877.56	64.56				1,992.37
Demeton													
Guthion													
N-nitrosodibutylamine	*		*	*	*			*	*				
N-Nitrosodiethylamine	*		*	*	*			*	*				
N-Nitrosopyrrolidine	*		*	*	*			*	*				
Pentachlorinated ethenes	*		*	*	*			*	*				
H-sulfide	110.88		16.73	221.58	127.40			257.49	217.91				951.98
2,3,5,6 tetrachlorophenol	*		*	*	*			*	*				
Thallium	*		*	*	*			*	*				
Antimony	*		*	*	*			*	*				
Beryllium	*		*	*	*			*	*				
Phenols	66.53		19.87	41.55	66.89			418.43	262.29				875.55

(*) below detection limits

(**) Quantities derived, by the Oceanic Society, from data in "Special Permit Application for the Disposal of Sewage Sludge from Fourteen New York City Water Pollution Control Plants at the Deepwater Municipal Sludge Dump Site" submitted to EPA by the New York City Department of Environmental Protection in January, 1987 and the "Response to EPA's Comments" on that document, submitted January, 1988.

(***) for pounds per year, multiply by 2.2

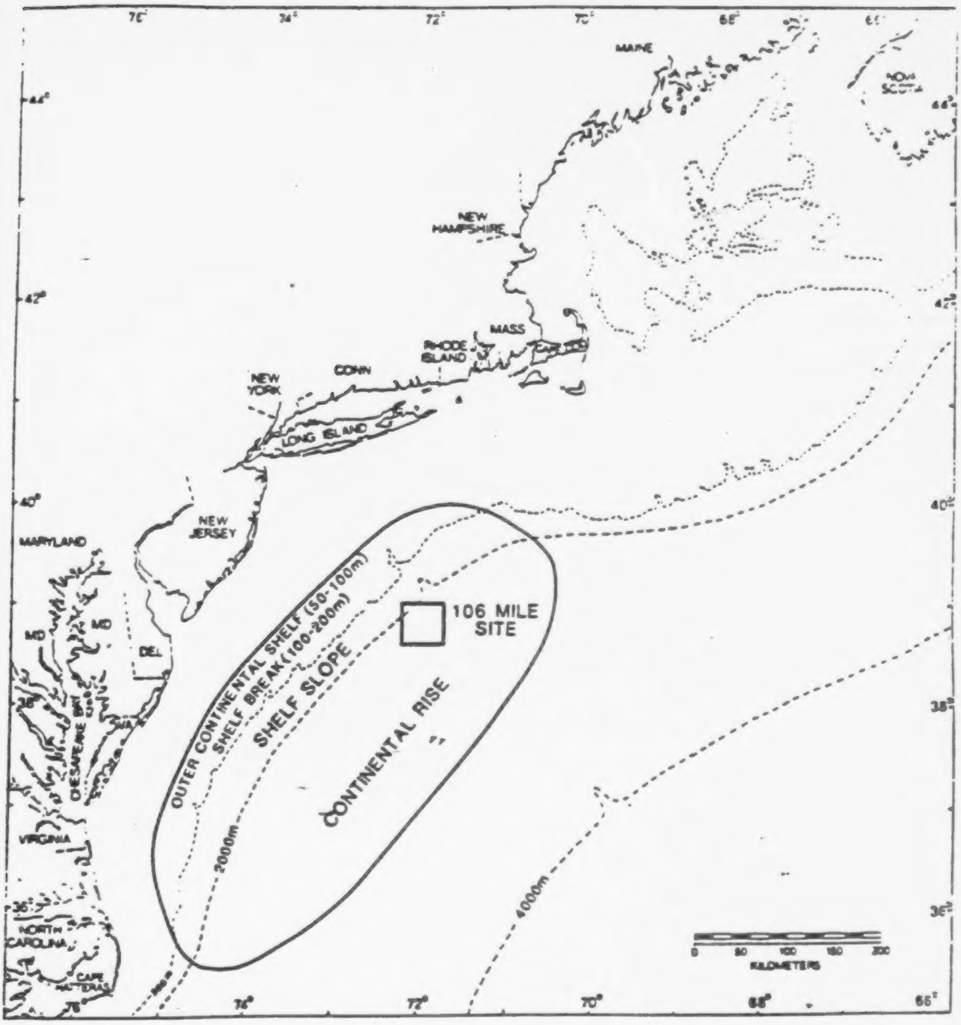
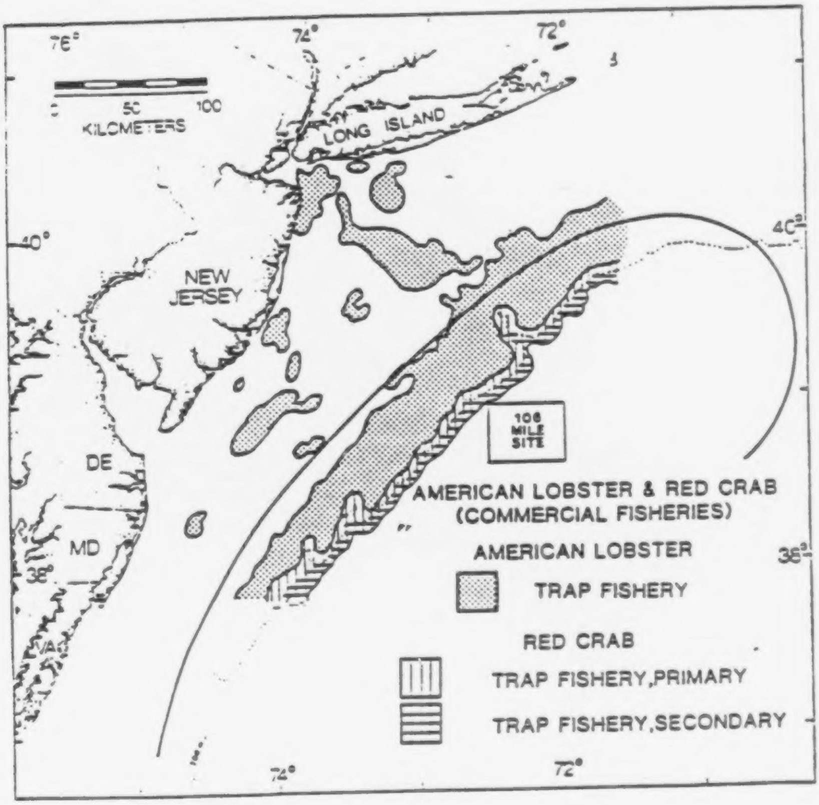

76°
74°
72°
70°
68°
66°
44°
42°
40°
38°
36°
MAINE
NOVA SCOTIA
NEW HAMPSHIRE
MASS
RHODE ISLAND
CONN
NEW YORK
LONG ISLAND
NEW JERSEY
MARYLAND
MD
DEL
CHESAPEAKE BAY
VIRGINIA
NORTH CAROLINA
CAPE HATTERAS
OUTER CONTINENTAL SHELF (50-100m)
SHELF BREAK (100-200m)
SHELF SLOPE
CONTINENTAL RISE
106 MILE SITE
2000m
4000m
0
50
100
150
200
KILOMETERS

Figure 1. The 106-mile dumpsite, potential area of impact (PAI) and major bathymetric zones within.

Source: National Marine Fisheries Service, "106-Mile Site Characterization Update," NOAA Technical Memorandum, NMFS - F/NEC - 26, August 1983.

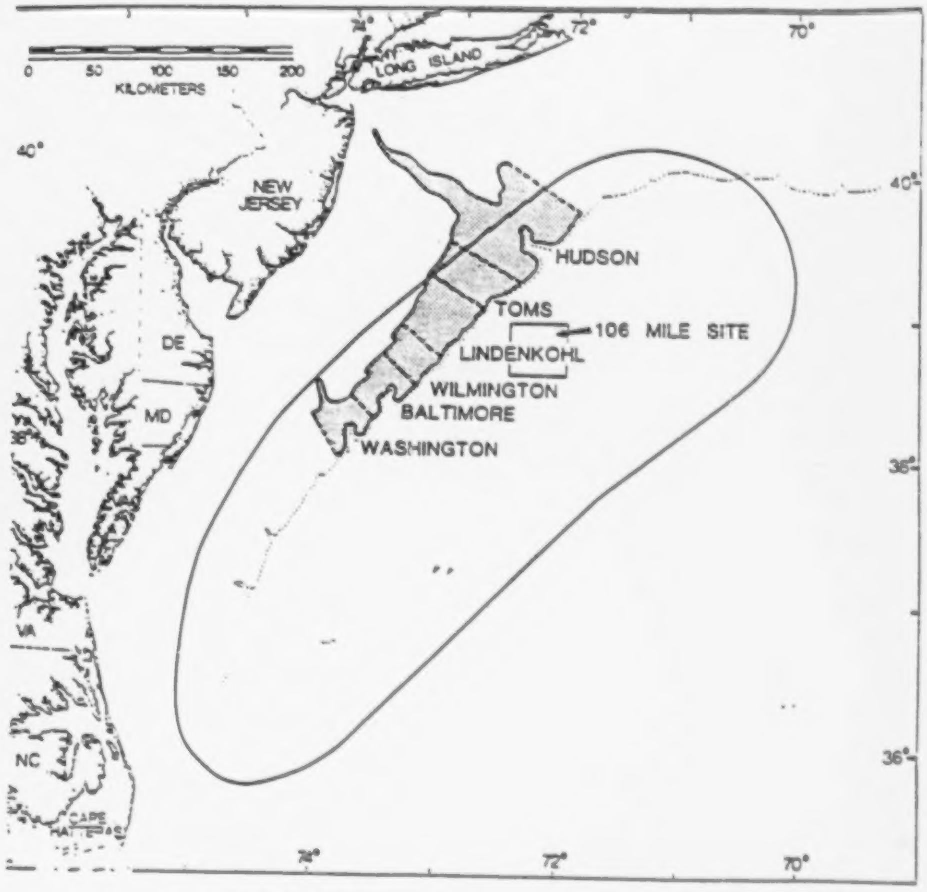
Figure 2


76°
74°
72°
0 50 100
KILOMETERS
LONG ISLAND
40°
NEW JERSEY
DE
MD
38°
VA
106 MILE SITE
AMERICAN LOBSTER & RED CRAB (COMMERCIAL FISHERIES)
AMERICAN LOBSTER
TRAP FISHERY
RED CRAB
TRAP FISHERY,PRIMARY
TRAP FISHERY,SECONDARY
74°
72°

New Jersey's commercial fishing grounds for American lobster and red crab (Long and Figley 1981) including location of Deepwater Dumpsite 106 (DWD-106) and its potential area of influence (PAI).

Source: National Marine Fisheries Service, "106-Mile Site Characterization Update," NOAA Technical Memorandum, NMFS-F/NEC - 26, August 1983.

Figure 3


0
50
100
150
200
KILOMETERS
74°
72°
70°
NY
LONG ISLAND
40°
NEW JERSEY
HUDSON
TOMS
106 MILE SITE
LINDENKOHL
WILMINGTON
BALTIMORE
WASHINGTON
DE
MD
VA
NC
CAPE HATTERAS
38°
36°

New Jersey's offshore sportfishing grounds (shaded area) including locations of submarine canyons and Deepwater Dumpsite 106 (DWD-106) and its potential area of influence (PAI).

Source: National Marine Fisheries Service, "106-Mile Site Characterization Update," NOAA Technical Memorandum, NMFS-F/NEC-26, August 1983.

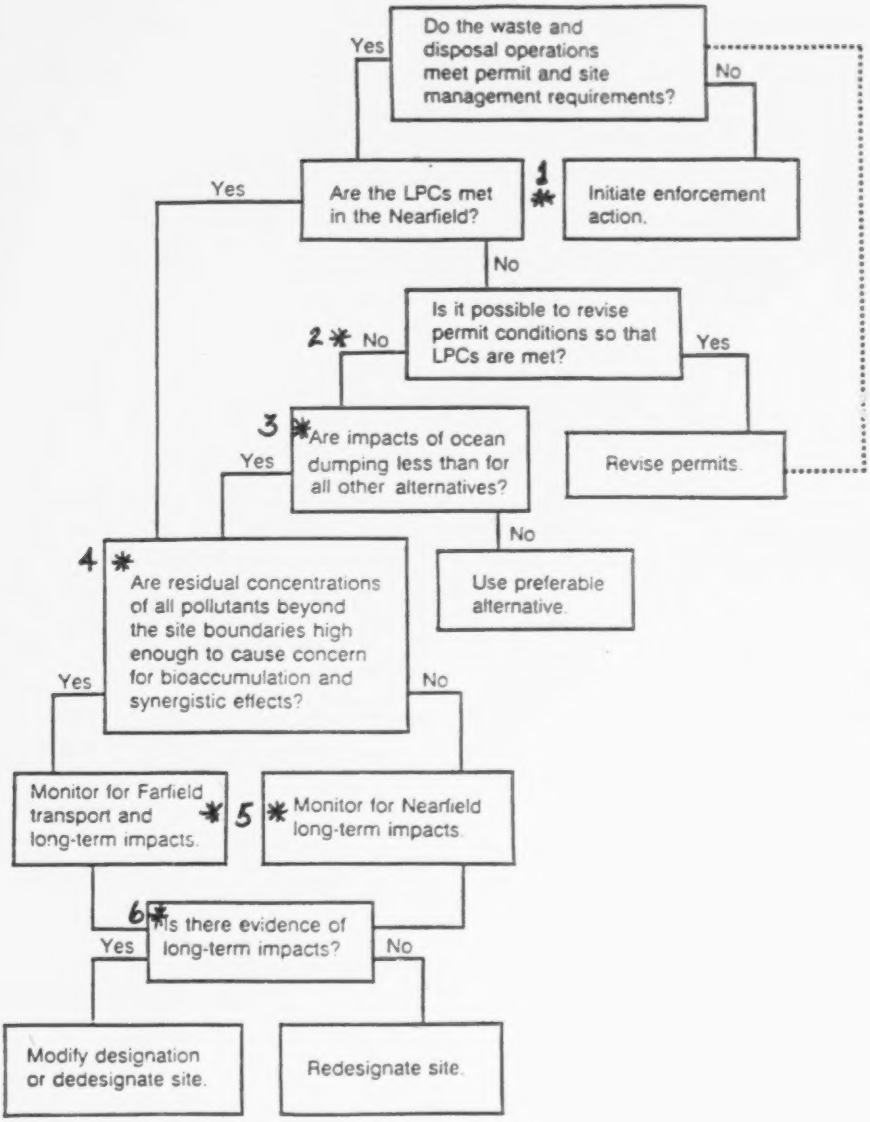

Do the waste and disposal operations meet permit and site management requirements?
Yes
No
Are the LPCs met in the Nearfield?
Yes
No
1 *
Initiate enforcement action.
Is it possible to revise permit conditions so that LPCs are met?
2 * No
Yes
Revise permits.
3 *Are impacts of ocean dumping less than for all other alternatives?
Yes
No
Use preferable alternative.
4 *
Are residual concentrations of all pollutants beyond the site boundaries high enough to cause concern for bioaccumulation and synergistic effects?
Yes
No
Monitor for Farfield transport and long-term impacts.
* 5 *
Monitor for Nearfield long-term impacts.
6 *Is there evidence of long-term impacts?
Yes
No
Modify designation or dedesignate site.
Redesignate site.

Figure 4 EPA's prescribed process for using monitoring results to make monitoring program, permitting, and site designation decisions.
The superimposed numbers (at*) refer to comments on page 34 of the text of the testimony.

A & S Transportation Co.
75 Jacobus Avenue
South Kearny, New Jersey 07032

May 16, 1989

Subcommittee on Oceanography and
the Great Lakes
Subcommittee on Oversight and
Investigations
Subcommittee on Fisheries and
Wildlife Conservation
U.S. House of Representatives
Room 1334, Longworth House
Office Building
Washington, D.C. 20515-6230

Re: EPA's Proposed Ocean Dumping Permits

Dear Committee Members:

On behalf of the 106-Mile Transport Associates, one of the New Jersey companies that transports sewage sludge to the 106 mile site, I submit this written statement pertaining to the joint hearing on Title I of Public Law 100-688 presently being conducted by your subcommittees. This statement addresses the new ocean dumping permits being proposed by the EPA.

Those new permits contain certain new conditions which will increase dramatically the safety and navigational hazards and risks of disposal and also make the disposal of municipal sewage sludge impossible. The operation of dumping vessels at the Site is inherently a hazardous one, because of the natural forces of the weather and ocean over which we have no control.[1] To increase those hazards for unsubstantiated reasons, such as the EPA proposes to do, would be an exercise of bad judgment.

A. The Safety Hazards of the New Permit Conditions

The condition which is most troublesome is Condition 24 of the proposed permit, which governs the sewage sludge dumping procedure. It, among other things, dramatically reduces the discharge rate, presently 15,500 gals/min, to an unreasonably slow rate ranging from 210 gals/min to 3,987 gals/min. Condition 24 also mandates that the dumping vessel must travel along a predesignated trackline in the Site which involves numerous turns.

---

[1] The hazardousness of this operation was recently highlighted by the recent incident in which the barge "Princess B" was separated from her tug and lost for over three weeks.

The decreased discharge rate will dramatically increase the amount of time which a dumping vessel will be required to spend at the Site. Presently, the barges are on site for approximately two to four hours. The decreased discharge rates will require vessels to remain at the Site, in many cases, for at least five days. Such a requirement increases the potential of exposure to hazardous conditions as well as the opportunity for accidents. Under normal circumstances, a vessel's potential exposure to navigational accidents increases correspondingly to the duration of time the vessel is at the Site. In inclement weather, the safety of the crew will be placed in even greater jeopardy.

In addition, the limitations of the new conditions create greater pressure on the vessels to travel to the site in marginal weather conditions. For instance, if the weather is such that the vessels are unable to dump for a week or ten days, which is not uncommon, that will result in a backlog of barges waiting to dump. Accordingly, the tugboat operators and the barges will feel pressure to dump the sludge as soon as possible and therefore may travel to the dumpsite in marginal, and thus more hazardous, weather conditions.

The imposition of a predesignated trackline, likewise, increases the hazards of the operation. The speed of the barges will be governed by the slowest vessel. Moreover, each vessel has to wait five hours before entering. The vessels also will be traveling near each other and will be required to make sharp turns, all of which increase the possibilities of endangering the lives of the crew.

These proposed conditions are simply too restrictive and inflexible, subjecting the lives of the individuals operating the vessels and the vessels to greater jeopardy. The safety of the crews is of overriding importance; it cannot be compromised. Therefore, the proposed conditions must be revised.

B. The Impossibility of the New Permit Conditions

In addition to the safety problems, the new reduced discharge rates would make it impossible to dump all the sewage sludge that is generated during the year. An analysis of the proposed discharge rates and volumes required for dumping reveal that a minimum of 876 individual barge trips per year will be required to dispose of the sludge generated during the year. Such activity will consume a minimum total of approximately 27,500 hours per year for discharging activities only.

Since there are only 8,760 hours in a year, it is clear that the new conditions will not permit all the sludge generated during the year to be disposed at the Site. This will result in a backlog of sludge at the sewage authorities' facilities, posing great health risks to the areas serviced by the facilities.

Further, and most importantly, after factoring in a minimum allowance for weather delays and a trackline distance of approximately 72 NM, it is our conclusion that an absolute minimum of 2,100 passes per year through the disposal site will be required by the proposed permit conditions. The maximum number of passes through the site available for discharge operations is approximately 900. Thus, the proposed permit requires a minimum of 2.3 times the number of passes that would be available during a one year period. These conclusions are based on an analysis of the minimum requirements of the conditions of the draft permit. Actual operating conditions will certainly result in even greater disparities.

In short, we submit that it will be physically impossible even with unlimited resources,[2] i.e., barges, men, etc., to dispose of the sludge generated during the year adhering to the conditions in the proposed permits.

C. The Arbitrariness of the New Permit Conditions

The above comments show that the EPA arbitrarily formulated the new conditions of the permit, giving no consideration to their impact on the safety and welfare of the personnel operating the vessels. The EPA also bases the new conditions on arbitrary conclusions without considering the practicalities of the operation.

The EPA treats the Battelle August 8, 1988 report as a complete and final report. For example, the equation developed by Battelle to predict discharge rates was characterized by Battelle as "preliminary." The EPA concluded in their Tentative Determination that the Battelle report resulted in the development and verification of this equation, which is clearly at odds with the Battelle report. Also, EPA contends that discharge rates must be altered to "ensure compliance with toxicity based limiting permissible concentrations at the DMSDS." The Battelle report, however, does not indicate that such compliance could be accomplished by the rates proposed since it repeatedly recommended additional studies be performed.

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[2] Our preliminary investigation indicates that there is insufficient equipment available to dispose of the sludge at the Site in accordance with the new conditions. Moreover, the EPA has failed to respond to our request for more information supporting the EPA's claim that sufficient equipment is available.

Additionally, the discharge rates proposed by EPA were developed on data collected from a side-dump type vessel when the vast majority of ocean dumping is accomplished via bottom dump vessels. Moreover, in Condition 32, the EPA seeks to impose joint and several liability on the permittee and the waste transporter for compliance with all conditions of the permit. Such imposition is unrealistic because compliance with certain conditions are within the exclusive control of the permittee. Liability for those conditions, therefore, cannot be placed upon the transporter. Similarly, compliance with other conditions are in the exclusive control of the transporter. Therefore, liability for compliance should not be imposed on the permittees. In short, as the above examples indicate, the EPA made arbitrary conclusions in formulating the proposed conditions in the permit.

Finally, and perhaps most enlightening of all, are pages 10 through 13 of the Tentative Determination issued by EPA, which contains repeated conclusions relating to the environmental impacts of continued ocean dumping at the Site. For example, EPA makes the following statements:

> "the liklihood [sic] of the sludge reaching near any shoreline in measureable [sic] concentrations capable of causing any adverse impact is extremely remote";
>
> "the site is not nor has it ever been important to commerce or recreational fishing, navigation, resource extraction or any other use"'
>
> "the disposal site and adjacent areas are not expected to suffer long-term changes in water quality as a result of sewage sludge. All observed water quality impacts have been short term lasting only a few hours";

> "sewage sludge is not expected to be an aesthetic nuisance in recreational areas";
>
> "there is little risk that pathogens contained in sewage sludge disposed at the DMSDS will cause a public health hazard";
>
> "there is little potential for human contact with waste disposal at the DMSDS";
>
> "waste disposal at the DMSDS is not expected to effect human health through consumption of seafood organisms"; and
>
> "there is no evidence of any significance effect of sewage sludge disposal on any living marine resources, including fish, birds, or mammals, other than potential temporary avoidance of the disposal area."

EPA then concludes in the overall sense the "disposal of sewage sludge has not and is not expected to degrade the environmental quality of effected areas, and no significant adverse impacts will result from such disposal." (Emphasis added.) Further, EPA concludes that "ocean disposal of sewage sludge is not expected to degrade other uses of the dumpsite or of adjacent ocean waters." These and other conclusions within the Tentative Determination clearly indicate that EPA believes that continued ocean dumping will have no negative environmental impact of any significance.

CONCLUSION

In short, the new conditions in the proposed permits are arbitrary, impractical, will subject the safety and welfare of the crews operating the vessels and the vessels themselves to a greater jeopardy and will make it impossible to dispose of all the sewage sludge that is generated during the year posing a greater threat to society and the environment.

Respectfully submitted,

Steven Townsend

ST/sa

STATEMENT OF FREDRICK H. KURTZ, EXECUTIVE DIRECTOR, MIDDLESEX COUNTY UTILITIES AUTHORITY

May 11, 1989

Thank you Committee Members and Mr. Chairman. My name is Fredrick H. Kurtz. I am the Executive Director for the Middlesex County Utilities Authority. I appreciate the opportunity on behalf of the six New Jersey Agencies presently disposing of sewage sludge in the ocean to discuss with the members of the committees (1) the status and terms of the proposed permits and (2) the status of negotiations concerning entry into an Agreement, both of which the Ocean Dumping Ban Act require to be in place before August 14, 1989.

I. Permits.

I am sorry to advise that the EPA has engaged in a course of action of unresponsiveness in connection with both the permits and negotiation of Agreements. With regard to permits, we are sad to say that in spite of the efforts and energy we put into cooperating with EPA, none of our comments were incorporated into the draft permit. EPA led us to believe that our input would be welcome. Instead we feel as if we were ignored. The lack of responsiveness by EPA to substantive comments submitted on crucial issues including discharge rates, monitoring, waste manifests, shiprider and inspection requirements has created a critical situation in light of the terms and conditions contained in the draft permit.

For many years, all Agencies have complied with the requirements of the Marine Protection, Research and Sanctuaries Act (hereinafter "MPRSA") with regard to the ocean disposal of sewage sludge. In the last eight (8) months, in a spirit of cooperation, this has required a significant amount of time and manpower to assist the EPA in an effort which the Agencies believed would result in the formulation and review of reasonable proposed dumping conditions. Throughout these meetings to discuss the proposed permit conditions, representatives of the EPA continually indicated that the Agencies' concerns would be addressed prior to the issuance of draft permits. Apparently, the EPA has chosen to ignore the concerns of the Agencies.

With regard to monitoring, a meeting between the Agencies and the EPA was held on November 30, 1988 in New York. Representatives of the EPA advised that they would respond to the Agencies' concerns by disseminating a Quality Assurance Quality Control Protocol. This was never received. Subsequently, on February 10, 1989, the Agencies and haulers met with the EPA in order to discuss monitoring, shipriders and manifest procedures. EPA representatives advised that they would conduct a pilot program to assist the Agencies in implementing proposed requirements concerning seals and that a training program, including manuals for inspectors, would be developed. Thereafter, on March 8 and March 10, 1989, the Agencies again met with EPA representatives in order to address issues concerning proposals for manifests, shipriders and seals. The EPA has still failed to respond to these issues.

With regard to discharge rates, the Agencies requested a meeting with the EPA, (by letter from Michael Brinker, Executive Director of Joint Meeting of Essex and Union Counties, dated January 24, 1989, attached to Exhibit A) to which the EPA has still not responded. In fact, as a result of the EPA's lack of response, on March 10, 1989, the Agencies submitted written comments addressing Agency concerns over proposals for discharge rates (an attachment to Exhibit C). The EPA has not responded to that document either.

At no time during any of these meetings was it ever apparent that the EPA would finalize a position concerning any of these proposals without modification reflecting the Agencies' concerns. Moreover, the EPA never responded to any communication from the Agencies in this regard. On the contrary, as is indicated above, the position taken by the EPA was that it would consider and take into account the concerns of all the Agencies. For what other purpose than to initiate a meaningful exchange of ideas between the Agencies and the EPA would there be for the EPA to issue in advance proposed permit conditions?

Therefore, it was not until after March 24, 1989, the date on which the draft permits were mailed, that the Agencies became aware with any degree of certainty that the originally discussed proposals concerning discharge rates, monitoring, shipriders, manifest, etc., would be incorporated in the draft permits without any reflection of the positions previously submitted by the Agencies on the various issues. In fact, in view of the recent questions raised by the consultant retained by the EPA to formulate the discharge rates, it was shocking that the EPA made no modifications.

Obviously, the Agencies have relied on the EPA's illusory willingness to cooperate in achieving workable permit conditions to their detriment. The EPA has now taken the intransigent and unreasonable position of completely disregarding all previous substantive comments as to the impossibility of fulfilling the draft permit requirements.

Notwithstanding reliance by the Agencies on previous EPA representations, the EPA arbitrarily has refused to briefly extend the comment period in order to provide the Agencies the short additional time needed to respond in a comprehensive manner. The EPA's denial of the Agencies' extension request, set forth in a letter written by Richard L. Caspe, dated April 21, 1989 (Exhibit B), indicates that the EPA's reason therefor is apparently that the statute provides a short time frame within which the permit must be finalized. However, in reviewing the EPA prepared schedule for compliance with the Ocean Dumping Ban Act, (also attached to Exhibit A), it is absolutely clear that if the EPA had granted the brief extension request, it would not have impacted upon the time frame within which the EPA must issue final permits (i.e. by the statutory deadline of August 14, 1989). In fact, the EPA reserved more than three months (from April 28, 1989 to August 14, 1989) to do nothing more than make its decision. The EPA's denial, therefore, was clearly unreasonable.

Attached hereto as Exhibit C are the other materials submitted at the public hearing regarding the draft permit conditions. These materials reiterate and further substantiate the comments previously given to the EPA, which comments have been completely and unreasonably disregarded. The EPA has issued a draft permit mandating requirements which are impossible to fulfill, needlessly duplicative, and/or unduly burdensome. The most important issue to the Agencies concerns Discharge Rates.

The issue of discharge rates at the dump site is one which troubles us greatly. The EPA has erroneously relied upon faulty assumptions and conclusions resulting in discharge rates which are impossible to fulfill. The flaws relied upon by the EPA in calculating the discharge rate are the subject of lengthy discussions submitted by EA Engineering Science and Technology, Inc. in their report, (an attachment to Exhibit C).

Other areas of concern are addressed in our submission and specifically our letter to the EPA dated April 28, 1989 (Exhibit A).

II. Agreements.

Concerning the negotiation of the Agreements, the entire course of dealing with the EPA has been characterized by an overwhelming effort on the part of every Agency to go beyond its obligation as set forth in the federal statute and by a total and irresponsible failure on the part of the EPA to provide any rationale for their position by way of a response. The EPA's position has been dictatorial without any rationale for their position basis in law or fact. In essence, the EPA has taken the position that may impose whatever requirements they see fit, irrespective of the law.

For example, on December 2 and 10, 1988, representatives from all New Jersey Agencies met with the EPA & New Jersey Department of Environmental Protection in New York to discuss the Agreements and permits. At the meeting, EPA officials were emphatic that because the New Jersey Agencies were committed to terminating ocean dumping by December 1991, each was entitled to enter into a Compliance Agreement. It was also the position of the New Jersey Department of Environmental Protection, which position remains unchanged as of this date, that under no circumstances could they sign an Enforcement Agreement, because to do so would contravene the New Jersey statutory mandate that ocean dumping cease by March 17, 1991. An Enforcement Agreement, by its terms would mean that ocean dumping would continue not only after the state deadline of March 17, 1991, but also beyond the federal deadline of December 31, 1991. The state could not agree to this. The documents attached as Exhibit D reflects this position.

During the first three months of 1989, each Agency individually met with EPA and DEP in order to review and prepare schedules for implementation of short term and long term land based disposal alternatives, demonstrating compliance with cessation of ocean dumping by the 1991 deadline. In fact, each Agency has submitted schedules clearly demonstrating compliance with the earlier State deadline. (See attached Exhibit E).

Apparently, for some reason unknown to the Agencies, the EPA changed its earlier "firm" position, and decided that it would insist, without basis on only entering into an Enforcement Agreement with each Agency. In fact, in February of 1989, the EPA sent to all Agencies a draft proposed Consent Decree and Enforcement Agreement, which was to serve as the only basis for further negotiation among the parties.

In response to that proposed Enforcement Agreement, a letter was prepared by the MCUA and joined in by all Agencies that both detailed the legal basis as to why each New Jersey Agency was clearly entitled to a Compliance Agreement and contained various comments on the substance of the Agreement. (See attached Exhibit F). Furthermore, on March 15, 1989, all Agencies met with the EPA and DEP in New York to discuss the reasons for the government's intransigence. The EPA insisted that they still did not understand the Agencies' position. The Agencies advised that a written response would be provided in greater detail. Thereafter, all Agencies met to prepare a uniform response and to draft a proposed draft Compliance Agreement. Copies of same were forwarded to EPA & DEP on March 22, 1989. (See Exhibit G, including a Compliance Agreement and a statement detailing the statutory provisions and legislative history illustrating that each Agency, being committed to the termination of ocean dumping prior to December 1991, is clearly entitled to a Compliance Agreement).

Notwithstanding this submittal, at a subsequent meeting on March 31, 1989, the Agencies were "told" in no uncertain terms that:

(1) the EPA would not enter into a Compliance Agreement;
(2) the EPA would provide a meaningful response as to the basis for its changed position.

Thus, despite that the Agencies offered to negotiate a Compliance Agreement, the EPA insisted that they would only consider discussing an Enforcement Agreement. Nothing has been received to date from either the EPA or the DEP to explain this change in position.

The Agencies continued to attempt to obtain a meaningful response from EPA & DEP. When the Agencies' efforts were entirely frustrated by the capricious refusal of the EPA to address this most crucial issue, a Declaratory Judgment action was reluctantly filed by the New Jersey Agencies asking a federal judge to decide the matter.

Notwithstanding the filing of the complaint, the Agencies invited the EPA and DEP to return to the negotiating table with a meaningful response and to further cooperate in seeking an expedited joint resolution through the Court as to the form of the Agreement. As of this date, these requests also remain unaddressed.

Further attempts at communication with the EPA regarding these issues were made by the Agencies and remain unanswered. In addition, correspondence was sent to the EPA, as is evidenced by Exhibit H, on April 20, 1989 and May 5, 1989. Thus, despite the critical time frame which the EPA has been literally holding over each Agency's head, the EPA has made no attempt to discuss these issues in more than six weeks.

On May 5, 1989, word was finally received that a tentative meeting was being scheduled. Yet to be addressed by the EPA is the role of the EPA in cooperating with the pending declaratory judgement action to obtain a resolution of the form of the Agreement. Through the Agencies efforts, Congresswoman Roukema has also requested an explanation as to why the EPA is proceeding with an Enforcement Agreement. (See Exhibit I).

Why do the Agencies care so much?

Why are the Agencies committed to working so hard to getting the EPA's attention and to eliciting a meaningful response?

Because the costs to the taxpayers served by these Agencies will be in excess of $600 million for implementation of land-based alternatives to ocean dumping alone. Despite that enormous cost, each Agency has committed all of its resources to meet the deadline required by law. However, despite the commitment and documentation of each Agency, the EPA insists that enforcement fees in addition to this whopping $600 million in costs, be imposed upon the Agencies. These unwarranted and unnecessary fees which total more than $25 million in 1990 alone, will place an unreasonable burden upon the taxpayers that the Agencies serve.

I would be happy to answer any questions you may have on any of these issues. Thank you again for the opportunity to appear before you.

CONTACT PERSON
FOR THE
INTER-AGENCY EFFORT: M. Anthony Vaida, Esq.

Vaida & Vaida
Nine Main Street
PO Box 647
Flemington, NJ 08822
(201) 782-1801

(Additional material was received for the record and placed in the files of the Subcommittee.)

MAY 17, 1989

STATEMENT OF

DENNIS C. COSSEY

before the

SUBCOMMITTEES ON:

OCEANOGRAPHY and the GREAT LAKES,

OVERSIGHT and INVESTIGATIONS, and

FISHERIES and WILDLIFE and the ENVIRONMENT

concerning the practicality and feasibility of

technological alternatives to ocean dumping of

municipal sewage sludge.

MR. CHAIRMAN, Members of the Committee.

I would like to preface my remarks by thanking you for the opportunity to share with you today my thoughts concerning the very real and very serious problem currently facing our cities and municipalities today---

****

finding a cost-effective and environmentally responsible solution for the treatment and disposal of our nation's sewage sludge.

****

During the past year we have witnessed an extraordinary number of events directly related to this chronic problem.

Public beaches have been repeatedly closed by local health authorities after discovering raw human waste washed ashore. This translated into the loss of hundreds of millions of dollars in tourist revenues to local economies.

We have seen a multi-billion dollar fishing industry suffer huge, unrecoverable financial losses stemming from the annual dumping of millions of tons of sewage slugde in our oceans.

We have read with dismay of cities forced to cancel traditional holiday celebrations due to the foul stench of sewage discharges into local tributaries due to the malfunction of an antiquated sewage treatment facility.

The list is endless, the trend is clear.

The 'how' and 'why' these problems came to exist is not what we are here to address today. We have defined the problems. What we want are solutions!

However these solutions are not going to be found in yesterday's answers to yesterday's problems.

The ability of conventional wisdom and conventional technology to deal with current and future environmental problems are painfully obvious. We have but to look no further than the front page headlines at any newsstand, or the news coverage of the latest disaster on network television. They are not getting the job done.

Never in our history have we, as a nation, felt so personally threatened by the magnitude of environmental devestation. Never in our history have we, as a nation, been so environmentally aware.

In recent years Congress has, in conjunction with various regulatory agencies, enacted legislation specifically designed to eliminate or severely curtail certain disposal practices. Including addressing the sludge disposal problem by passing the Ocean Dumping Act of 1988, forbidding the ocean disposal of sewage sludge as of December 31, 1991. Recently the Environmental Protection Agency released its long awaited Part 503 Sludge Revision Rules designed to lessen the impact of sludge born contaminants and heavy metals. The results of this and other similar legislation will produce far reaching and positive effects.

But as Congress legislates out of existence the more environmentally unacceptable disposal methods, new land based alternatives must be found to replace them.

There are literally dozens of new disposal technologies on the horizon and new ones on the drawing board close behind them. Although many of them create as many problems as they solve, some of them can and do live up to expectation. That is they are capable of performing as advertised. However few are actually acknowledged, even less of them tested and fewer still are implemented.

The problem is that no municipality, township or sewage district alone has the manpower, the time or financial capability to test or evaluate these new technologies. In this highly capital intensive industry, it is expensive enough to effect a change over to a new sewage sludge disposal system in the first place, but it would be financially devestating for a city to select and implement a system that did not work. Thus, conventional methods continue in use, struggling to cope with technical demands they were never designed to handle.

Legislation and regulatory statutes have legally banned ocean dumping,levied more stringent rules for landfills, limited certain land application of sludge and composting and increased air quality and ash disposal regulations for incinerators. These five basic conventional methods account for almost 100% of current U.S. sludge disposal options.

This makes the search for new sludge disposal alternatives not only environmentally desireable but mandatory.

The responsibility for identifying, evaluating and testing can only belong to the federal government. What cannot be accomplished individually can be solved collectively. Due to the economy of scale, federal tax dollars can be leveraged on a much more cost-effective basis for the benefit of all.

I think the staggering burden of cleaning up our decaying and dying environment has taught us many important lessons. History has made it crystal clear that it is much cheaper to prevent environmental and ecological damage than to clean it up.

SUBCRITICAL WATER OXIDATION -- DEEP-WELL TECHNOLOGY FOR SLUDGES

ACKNOWLEDGMENT

APPRECIATION IS EXPRESSED
FOR THE SUPPORT OF

OXIDYNE, CORP.
14881 QUORUM DRIVE, DALLAS, TX 75240
214/701-8200

IN THE PREPARATION OF THIS REPORT

Dr. Earnest F. Gloyna, P.E.
Bettie Margaret Smith Chair in
Environmental Health Engineering
ECJ Hall, The University of Texas at Austin
Austin, Texas 78712

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SUBCRITICAL WATER OXIDATION--DEEP-WELL TECHNOLOGY

ABSTRACT

As the population grows, the need for goods and services continues to increase. The resulting impact of this growth is manifested in increased amounts of wastewaters and sludges, complexity of pollutants, and levels of toxicity.

The growing demand for solving the waste treatment and disposal problem has resulted in development of innovative waste treatment processes which are destruction-efficient, energy-saving, self-contained, and cost-effective.

There exists a growing body of knowledge in subcritical, deep-well water oxidation systems. This concept provides a convenient method for the disposal of sludges without the use of costly dewatering technology and ultimately incineration. In the Oxidyne, deep-well, subcritical reactor, the organic matter can be destroyed while the pollutant is dissolved or suspended in water. Destruction is accomplished by reacting the wastewaters with oxygen at an appropriate temperature, pressure, and detention. The deep-well concept is attractive because it is safe and self-contained. The well depth can be utilized to provide some or all of the required pressure. The surface area required is relatively small and the overall environmental impact is essentially zero.

The concept of deep-well technology using subcritical water oxidation was demonstrated at Longmont, Colorado. The Longmont reactor processed 1,283 dry tons (DT) of municipal sludge for over one and a half years. Organic destruction was 80% or greater. The ash passed EPA toxicity tests. Additional information is described in this report and elsewhere.

A full-scale, deep-well, subcritical water oxidation facility is scheduled to treat sludge produced by the Sims-Bayou wastewater facility, Houston, Texas. This Oxidyne Sludge Processing Facility (SPF) is expected to provide removals of about 95% total suspended solids (TSS), 98% volatile suspended solids (VSS), 93% chemical oxygen demand (COD) and 91% biochemical oxygen demand (BOD).

INTRODUCTION

Deep-well, waste treatment technology combined with the subcritical water oxidation process offers an innovative alternative to many sludge and wastewater treatment problems. This waste management concept offers a system that is efficient, self-contained, safe, and cost-effective. The volume of sludge can be reduced and the waste products can be utilized or returned to the environment.

The present cost of waste management using conventional technologies is creating an enormous financial burden, but future costs will be even greater. Moreover the ecological and health problems associated with some current technologies are unacceptable.

Increasingly, people have become aware of the long-term health effects of pollutants. The public has expressed great concern about sludge disposal and toxic wastes. The federal, state, and local agencies have responded to the public outcry. The last decade has produced an unprecedented explosion in environmental laws and rulemaking activity. At the same time the federal government has moved the responsibility of funding the waste clean up and sludge disposal problems to the manufacturers and the local governments. Since it has become abundantly clear that consumers must ultimately pay the cost of maintaining a clean environment, the bottom line mandates more efficient, reliable, and cost-effective waste management technologies.

The cost of the new and possible future regulatory controls will be extraordinarily large. According to Lee Thomas, EPA Administrator, new laws "will rattle through the U.S. economy like a golf ball going through a drainpipe."

The more important Federal enactments impacting on pollution elimination and control technologies are listed below:

1. *National Environmental Policy Act* (NEPA) -- enacted in 1969, amended July 3, 1975 and August 9, 1975.

   Congress established an environmental Magna Carta in passage of NEPA. The Act establishes policy, sets goals, and provides direction for carrying out the policy. The Environmental Impact Statement (EIS) is the heart of NEPA.

2. *Clean Water Act* (CWA) -- enacted in 1970.

   A series of clean water acts has contributed to the upgrading of harbors and rivers (fishable and swimmable) and water supplies. Six major enactments are listed below:

   a. Refuse Act of 1899 and 1970.

b. Federal Water Pollution Control Act, 1948.

c. Water Quality Act of 1965 (water quality standards for interstate waters).

d. Federal Water Pollution Control Act (amendments of 1972--provided major changes in philosophy and approach).

e. Clean Water Act (CWA) of 1977 (mid-course corrections to 1972 amendments).

f. Municipal Treatment Construction Grant Amendments of 1981 (restructured the sewage treatment construction grants program). In the development of "third round" NPDES permits, EPA is moving beyond technology-based controls and water quality evaluations as based on conventional parameters. The focus on the new "Post BAT", best available treatment, permits is to ensure that adequate controls are being implemented to confirm the protection of human health and aquatic life on a site-specific receiving stream basis. No source will be allowed to discharge any wastewater which will result in the endangerment of a drinking water supply, aquatic bioaccumulation which threatens human health, instream acute or chronic aquatic toxicity, or a violation of an applicable general or numerical state water quality standard.

3. *Comprehensive Environment Response Compensation and Liability Act* (CERCLA) – December 11, 1980.

   Superfund Legislation provides a broad definition of concerns--releases of hazardous substances--not just hazardous wastes. The focus is on past management practices and spills.

4. *Superfund Amendments and Reauthorization Act* (SARA) -- 1986.

   SARA established the concept that "the polluter should pay" and developed a new dimension in establishing responsibility. Now the federal government can use two powerful principles of liability--Joint and Several Liability and Strict Liability. In the former, parties responsible at a Superfund site can be sued together or separately for 100% of the cleanup costs. Strict liability is liability without a showing of fault.

5. *Resource, Conservation, and Recovery Act* (RCRA) -- enacted in 1976, amended in 1980.

   RCRA embraces five major elements in the federal approach to hazardous wastes management: federal classification of hazardous wastes; cradle-to-grave manifest systems; federal standards; enforcement through a permitting program; and authorization of state programs for operations. RCRA did not deal directly with abandoned sites. It does not concern itself with hazardous substances which are within the productive streams of commerce and are handled under the Toxic Substances Control Act nor does it consider pesticides which are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act. By definition hazardous wastes display four characteristics: ignitable, corrosive, reactive, and toxic. RCRA regulates the generation, transportation, treatment, storage, and disposal of all hazardous wastes. Since RCRA defines solid wastes, this regulation can impact the management and operation of virtually all wastewater treatment plants. RCRA, unlike CWA, requires essentially a zero discharge of hazardous constituents from treatment plants receiving any amount of hazardous wastes. EPA is currently proposing to add additional specific organic chemicals to the list of specific chemicals exhibiting toxicity.

6. *Hazardous and Solid Waste Management Act (HSWA)* – enacted in 1984. HSWA amendments to RCRA promote waste detoxification and destruction. Under the "new RCRA", the cost to the regulated community has been estimated to approach $20 billion per year by the 1990s. Costs of managing hazardous wastes will then be at a level comparable to the air and regulatory programs. Under HSWA there are 72 deadlines, 58 requiring action within only two and a half years enactment. HSWA equated to incineration would require that "incineration capacity quadruple over the next five years" (Former Director, EPA Office of Solid Waste). This level of burning requirement would translate to 82 new incinerators having a capacity of 20,000 metric tons per year (EPA Office of Policy, Planning and Evaluation).

THE NEED FOR SLUDGE AND TOXIC WASTE TREATMENT

The costs of treatment and handling of primary and secondary sludges are about 50% of the wastewater treatment expense. This cost is likely to increase due to increased effluent requirements and larger amounts of sludges generated as a result of additional chemical usage. Also, volume reduction is required because of limited space for disposal of residuals.

The higher the degree of wastewater treatment the greater the sludge volume. Primary treatment, sedimentation, typically produces 2,500 to 3,500 liters of sludge per million liters of wastewater treated. Biological secondary treatment produces an additional 15,000 to 20,000 liters per million liters of wastewater treated. If chemicals are used in phosphorus removal during tertiary treatment, the sludge volume will increase by another 10,000 liters per million liters treated.

Presently, municipal waste flow is about 101.25×10^6 m^3/d (27 billion gal/d) and this wastewater contribution will increase to 161.25×10^6 m^3/d (43 billion gal/d) by the year 2005. In 1982, the wastes from domestic and industrial sources, respectively, produced sludges in the amount of 17.8 and 16.2 million metric tons (MMT) (19.6 and 17.9 million tons). To comply with efficient management practices, this volume of sludge must be reduced. Most of this sludge volume will have to be reduced by incineration or deep-well, subcritical water oxidation (subcritical WAO) or supercritical water oxidation (SCWO). Disposal of the untreated sludges by land application or placement in a sanitary landfill is simply not feasible for larger communities or industrial establishments. The land disposal problem of bulk, untreated residues is illustrated in the huge nontoxic garbage problem. While solid wastes and refuse are not part of the sludge and liquid waste problem, they are illustrative of the growing problem. For example, in 1987, people living in northern New Jersey were paying $18 a ton to dump their garbage. But a year later the costs escalated to $137 a ton.

Industry generates about 99% of the nation's hazardous waste and the amount continues to grow. About 160,000 industrial and commercial facilities in the U.S. discharge wastes containing hazardous constituents. This discharge is equivalent to about 12% of the flow from publicly owned treatment works (POTW). It is estimated that 92×10^6 kg (203×10^6 lb) of hazardous pollutants are released to the POTWs annually. According to the Domestic Sewage Study certain priority organic pollutants have been frequently detected in POTW influent streams.

MUNICIPAL AND INDUSTRIAL WASTES

Sludges are derived from the treatment of wastewaters. Primary sludge contains about 3% to 7% solids. Secondary sludge, the by-product of biological treatment has a lesser solid content, about 0.5% to 2%. These secondary sludges are more difficult to dewater. The most difficult sludges to dewater are the chemical sludges, so-called tertiary sludges, because these sludges usually bind water.

The most important constituents in municipal sludges are: total organic content, nutrients, pathogens, metals, and toxic organic chemicals. Unstabilized municipal sludges generally contain 75% to 85% volatile solids (VS) on a dry weight basis. The VS can be removed by heat, 550 °C (1,022 °F), but incineration involves additional energy and costly air control systems.

According to EPA, 16% of industrial pollutants in wastewater are removed to the sludge, 14% air stripped, 67% biodegraded, and 3% passed to recovery waters (Darcey, 1987). The sludge generally contains 93% to 99.55% water and substances that were present in the wastewater or were added by the treatment processes.

The annual wastes generated by municipalities and industries are summarized in Tables 1 and 2. Roughly 50% to 60% of the municipal sludge market appears to be suitable for deep-well, subcritical water oxidation. Possibly 40% of the annual sludge generated by industry is applicable to deep-well treatment. An estimated 225 x 10^6 m^3 (60 billion gallons) of industrial wastewaters are receiving secondary treatment. Some of these wastes might be selected for deep-well treatment at the pretreatment stage prior to end-of-pipe treatment.

Various amounts and types of sludge are produced by different treatment processes. The properties of sludges, conventional treatment processes and disposal of residuals are described in Appendix A.

Table 1. Summary of U.S. Municipal Sludge Market (Oxidyne, 1988)

Sludge Type	Annual Waste Generated (1) DT/yr x 10^6	Market Applicable to Oxidyne Technology(2) DT/yr x 10^6	Competing Technology (3)	Cost of Competing Technology (3) \$/DT
Municipal	19.6	11.0	A,B,C,D	325

(1) Annual waste quantities from EPA Needs Survey, 1982. (1 DTx10^6= 0.908 MMT)

(2) Based on analysis of the distribution of municipal plant sizes and a matching of competing costs to applicable size ranges; Oxidyne market includes plants over 20 mgd.

(3) Competing technology and costs based on comprehensive analysis of 25 system designs for small, medium, and large plants; cost estimating procedures used were; EPA as built costs, CAPDET cost program, planning level cost estimating procedures, EPA I/A manual and JMS experienced cost files; over 400 separate cost sources used. Costs shown are weighted average costs of the actual distribution of competing technology.

Competing Technology & Cost:

A.	Anaerobic digestion, dewatering, and landfill	280-400 \$/DT
B.	Heat treatment, dewatering, and landfill	400-450 \$/DT
C.	Anaerobic digestion, hauling, and land application	340-400 \$/DT
D.	Dewatering and incineration	300-425 \$/DT

Table 2. Summary of U.S. Industrial Sludge Market (Oxidyne, 1988)

Sludge Type	Annual (1,2) Waste *Generated* T/yr x 10^6 (gal/yr x 10^9)	Market (3) Applicable to Oxidyne *Technology* T/yr x 10^6 (gal/yr x 10^9)	Competing *Technology*	Cost of (4) *Competing* Technology
Industrial Sludge	17.9	7.2	A,B,C,D,E	$280-400/DT
Industrial Wastes				
Bio-Treat	-	(4,700) (5)	F,G	$0.01/gal.
Other	-	(1,340) (6)	H,I	$0.03/gal.

Competing Technology
A. Anaerobic digestion, dewatering, and landfill
B. Dewatering and incineration
C. Dewatering and landfilling
D. Dewatering and landfilling
E. Incineration
F. Lagooning (total containment)
G. Biological treatment and discharge
H. Physical-chemical treatment, advanced waste treatment (AWT), and discharge
I. Deep-well injection, no pretreatment

Notes:
1. From 1983 USEPA report, Inventory of Nonmunicipal Sludges.
2. From Internal Oxidyne Market Study, November, 1986.
3. From 1984 CMA Hazardous Waste Survey. Quantities adjusted upward by 20% due to only 80% survey response. (Chemical Manufacturers Association and Engineering-Science, Inc., Jan 1986).
4. Costs based on JMS market assessment, EPA Industrial Guidelines Waste Development Documents. Deep-well injection costs based on paper presented by M. Guthrie of Engineering-Science, Inc. Costs for injection range from $1.44/gal. with no pretreatment to $0.06/gal. with pH and other pre-treatment.
5. Estimated quantities that receive secondary biological treatment and discharge to receiving stream, Oxidyne not competitive for these wastes.
6. Based on 20% of industrial wastewater requiring advanced waste treatment where cost for treatment increases to $0.03/gal, including sludge disposal.

HAZARDOUS AND TOXIC WASTES

The amount of hazardous wastes produced by industry is about 334 MMT per year (368 million tons/yr) of which about 2.27 MMT (2.5 million tons) are believed to be hazardous solids. The hazardous liquid wastes are estimated to be 394 x 10^6 m^3/yr (104 billion gallons/yr) of which 77% might be applicable to deep-well technology, Table 3. An overview of the hazardous waste disposal problem in industry is presented in Table 4. The total number of hazardous waste generators is established to be over 14,000 and of these 6.8% are in the chemical industry. Those that potentially could benefit from deep-well subcritical water oxidation are listed in Table 5.

According to RCRA data, hazardous wastes contributed by industry total over 266 MMT (293 million tons), and by 1990 EPA estimates this level will increase to 280 MMT (309 million tons). Chemicals and Allied Products account for 30% of this total. There are about 70,000 and 125,000 respectively, large and small hazardous waste generators. A small generator is classified as one which produces between 100 and 1,000 kilograms (220 to 2,200 lbs) of hazardous wastes per month. Due to an estimated 68% decrease in the total available land disposal facilities (516 from 1,635), the average waste per facility per day must increase by 2,500 metric tons (2,756 tons) or about 240%. According to the Association of State and Territorial Solid Waste Management Officials, about 27,000 suspected hazardous waste sites have been identified in the U.S. The total cleanup bill could be in the hundreds of billions of dollars. Even if the costs are reduced through neutralization, the ultimate cost could be between $50 to $100 billion. Obviously, the impact on corporate America will be unbelievably great.

Furthermore, under "new RCRA" it is estimated that the cost for compliance will approach $20 billion per year by the year 1990. To accommodate this enhanced level of oversight activity, the U.S. Environmental Protection Agency has requested a 1989 budget of about $4.8 billion. Presently, RCRA regulates about 250 MMT (276 x 10^6 tons) of hazardous waste generated annually. However, of the 2,100 hazardous waste land-disposal sites that were active in 1984, there remain less than 300 in operation today (Anon., 1988). Today, about 20% of the 951 sites on the Superfund National Priority List (NPL) are municipal landfills (Steinzor, 1988).

The number of sites available to receive hazardous wastes is decreasing as the anticipated large volume of hazardous wastes resulting from cleanup programs continues to accumulate. New regulations have brought under control thousands of other potential sources of hazardous wastes. Small quantity generators, waste-oil dealers and recyclers, and leaking underground storage tanks are now under regulatory scrutiny. No industrial, municipal, or federal facility will be allowed to discharge any wastewater which endangers drinking water and human or aquatic health and causes a violation.

Table 3. Summary of U.S. Hazardous Wastes Market (Oxidyne, 1988)

Sludge Type	Annual (1) Waste Generated T/yr x 10^6 (gal/yr x 10^9)	Market (2) Applicable to Oxidyne Technology T/yr x 10^6 (gal/yr x 10^9)	Competing Technology	Cost of (3) Competing Technology
Hazardous Wastes	435			
Hazardous Wastewaters	432.5 (104)	324 (77.7)	G,H,I,J,E	$0.08/gal(2)
Hazardous Solids	2.5	1.88	B,C,E	$571/ton(4)

Competing Technology

B. Dewatering and Incineration	H. Physical-Chemical Treatment and Discharge
C. Dewatering and Landfilling	I. Deep-well Injection, no pretreatment
E. Incineration	J. Landfill
G. Biological Treatment and Discharge	

Notes: (Chemical Manufacturers Association & Engineering-Science, Inc., Jan. 1986)

1. From 1984 CMA Hazardous Waste Survey. 1983 quantities adjusted upward by 20% due to only 80% survey response plus estimated 25% increase in waste generation since 1983 (5% per year).
2. Based on distribution of liquid and solid hazardous waste disposal practices as described in CMA report and Oxidyne's applicability as an alternate to current methods of treatment.
3. Cost of competing technology based on weighted average costs of current disposal practices as described in 1984 CMA report. Costs are from "Technologies and Management Strategies from Hazardous Waste Control OTA."
4. Based on distribution of current treatment methods from CMA report.

Table 4. Hazardous Waste Disposal Overview (Oxidyne, 1988)

No. of chemical industry generators	- 2,443 SIC Code 29
No. of fabricated metal producers	- 2,636 SIC Code 34
No. of electrical equipment manufacturers	- 1,515 SIC Code 36
No. of other metal-related products	- 2,222 SIC Code 33, 35, 37
No. of all other manufacturing	- 3,208 SIC Code 20-27, 29-32, 38-39
No. of nonmanufacturing industries and not specified by kind industries	- 2,074 —
TOTAL No. of Hazardous Waste Generators	14,098
TOTAL Quantity of Hazardous Wastes Generated -	$(2.7 \times 10^8 \ m^3/yr)$ 7.1×10^{10} gallons/yr
% of total generated by chemical industry -	68% - SIC Code 28
% of total generated by oil refining industry -	3% - SIC Code 29
% of total generated by metal related industries -	22% - SIC Code 33-37
% of total generated by all other industries -	7% -
% of hazardous wastes managed on site - all industries -	96%
% of hazardous wastes recycled - all industries -	4%
Quantity of hazardous wastes treated -	$(1.8 \times 10^8 \ m^3/yr)^*$ 4.75×10^{10} gallons/yr
Quantity of hazardous wastes stored -	$(1.4 \times 10^8 \ m^3/yr)^*$ 3.6×10^{10} gallons/yr
Quantity of hazardous wastes disposed of -	$(5.6 \times 10^7 \ m^3/yr)^*$ 1.47×10^{10} gallons/yr

*Due to overlaps the quantities treated, stored, and disposed of amount to more than that generated i.e., some stored wastes are also treated or disposed of.

Table 5. Applicability of Oxidyne Technology to Organic Wastes Generated in the United States (Oxidyne, 1988)

Waste	Subcritical Water Oxidation
Municipal Wastes	
Raw Sludge	X
Waste Activated Sludge	X
Industrial Wastes (SIC Number)	
Industrial Organic Chemicals (281)	X
Plastics Synthetics (282)	X
Drug Manufacturing (283)	X
Paints and Applied Products (2852)	
Industrial Organics Agricultural Chemicals (286, 2879)	X
Explosives (2892)	X
Petroleum and Coal Products (29)	X
Rubber and Miscellaneous Plastic Products (30)	X
Hazardous Compounds	
Acrylonitrile Wastewater	X
Cyanide Wastewater	X
Polychlorinated Biphenyls (PCBs)	
Pesticide Wastewaters	X
Halogenated Aliphatics: 1,1,1 - trichloroethane	
Ketones: Methyl ethyl ketone	
Organic Nitrogen Compounds: 2,4 - Dinitrotoluene	
Halogenated Aromatics: o-chlorotoluene	
Aromatic Hydrocarbons	X

ALTERNATIVES FOR TREATMENT AND DISPOSAL OF WASTES

Advantages as well as limitations of various wastewater treatment and sludge volume reduction options are shown in Table 6. Dilution, deep-well injection, and solar evaporation are generally not applicable. When wastes are not acceptable for biological treatment or other forms of treatment, the alternative method of disposal involves destruction or hauling as a hazardous waste under RCRA regulations. Reported charges for hauling hazardous wastes are as follows (Baillod, 1985):

- Barrelled waste: $50 to $70 per 55 gal drum plus $3 per loaded mile shipped ($0.24 to $0.34/L plus $1.86/km)
- Bulk waste: $0.55 to $0.75 per gal plus $3 per loaded mile shipped ($0.15 to $0.20/L plus $1.86/km)

As a comparison, costs of secondary biological municipal wastewater treatment are about $0.13/1,000L ($0.50/1,000 gal). However, municipalities may charge industry $0.11 to $0.22/kg ($0.05 to $0.10/lb) of COD removed.

For toxic materials such as 2, 3, 7, 8-tetrachlorodibenzoidioxin, high temperature incineration may provide a solution. However, this technology requires highly specialized equipment, expert operation, and considerable maintenance. (Bumb, et al., 1980).

Today, wastewater sludges are more complex and difficult to treat. As compared to the past, sludges are more difficult to dewater, and they are more likely to contain toxic substances. Fuel requirements for dewatering or burning are both more expensive and less plentiful. Air emission standards are much more stringent.

New levels of detoxification and volume reduction increasingly require the utilization of high-temperature processes. Such systems include the following: (1) subcritical, deep-well water oxidation; (2) supercritical, deep-well water oxidation; (3) incineration; (4) starved-air combustion; (5) co-combustion of sludge and other material; (6) other high temperature processes; and (7) in some cases, low-temperature wet air oxidation.

Table 6. Alternatives for Treatment and Disposal of Wastewaters

Technique	Acceptability
1. Dilution	No.
2. Biological/Physical /Chemical	Economical, efficient for dilute organic concentrations; removals of about 50% to 90⁺%.
3. Deep-Well Injection	Costly, technically feasible, but progressively unacceptable.
4. Solar Evaporation	Air pollution and groundwater problems.
5. Land Disposal	Potential groundwater pollution and crop contamination.
6. Oxidation-Regeneration	Carbon adsorption is usually applicable for waste concentrations below 1%.
7. Incineration	Adaptable for concentrated wastes (>20%); subject to air pollution regulations; requires temperatures of about 900 °C to 1100 °C and residence time of 2 sec.
8. Ozonation	Limited by rate of mass transfer; produces residual low-molecular weight compounds which are oxidized slowly (similar to WAO).
9. Wet Air Oxidation (Above Ground)	Removals of 50%⁺; relatively expensive, involves two phased mixtures; high recycle rates; solubility of oxygen is insufficient to promote complete oxidation; off gas requires treatment; operates at 175 °C to 320 °C, pressures of 20 to 200 atm., and residence times of 0.5 to 2 hr.
10. Subcritical, Deep-Well Water Oxidation	The Longmont demonstration facility was operated successfully: corrosion and pitting not excessive; no odor; and 70% to 80% COD reduction of municipal sewage sludge.
11. Supercritical, Deep-Well Water Oxidation	Potential complete removal of organic substances; enhanced efficiency and reduction in capital cost; applicable to wide range of organic wastes; efficient counter current heat exchanger; short reaction times; suitable for large volume flows; no odor; and off gases can be vented to the atmosphere.

INCINERATION/PYROLYSIS

Two technologies, incineration and pyrolysis, may be used to achieve thermal destruction. Incineration requires the presence of oxygen, while pyrolysis is an oxygen-starved technology.

A typical incineration facility consists of charging and auxiliary fuel systems. The basic units include: combustion, ash discharge, quench, caustic absorber, venturi scrubber, draft fan, and stack. The scrubber system is needed to remove particulate matter and hydrochloric acid formed with the destruction of chlorinated hydrocarbons. Conceptual engineering costs for a commercial liquid waste incinerator are significant. Including the cost of permitting, these conceptual costs can approach $2 million. Unless the EPA grants a Part B permit under RCRA, it will be necessary to prepare a test burn protocol document. The development of such a protocol may approach $20,000 (Star, 1985).

The incineration of municipal sludges is regulated under the Clean Air Act (CAA). The National Ambient Air Quality Standards (NAAQS) provide guidance for specific pollutants controls. The CAA specifies discharge standards that must be met regardless of whether emission controls are necessary to meet specific air quality standards. In addition, there are national ambient air quality standards for six pollutants: ozone, total suspended particulates, sulfur oxides, lead, nitrogen dioxide, and carbon monoxide. If one or more of these ambient air quality standards are not met, the area is designated as nonattainment. In this case, before an incinerator can be built, it is necessary to obtain emission offsets greater than or equal to the increment in emissions that the new incinerator would cause.

Incineration is usually considered to be a controlled combustion process for burning solid, liquid, or gaseous combustible wastes and converting these wastes to gases and residues containing little or no combustible materials (Lee, 1982). The end products of sludge incineration include: particulate matter carried by the gas stream, incinerator residue, siftings, CO_2, N_2, NO_x, SO_x, and process water.

Emissions from waste incinerators may contain various trace amounts of toxic metals. Metals such as anitmony, arsenic, cadmium, nickel, selenium, vanadium, and zinc may be found in the atmosphere (Kalman, 1988). It seems that 50% of the lead and 5% of the mercury remain in the bottom ash after incineration. Thus, the partitioning of metals in hazardous waste thermal destruction devices is of increasing interest to regulatory authorities.

Partitioning phenomena include: vaporization; entrainment of ash particles; condensation of metal vapors; coagulation of particles; wall deposition of vapors and particles; and particle removal, e.g., air pollution control and treatment train. Generally, vaporization is the most important phenomenon. It appears that most of the particles that will be emitted by the incinerator will have been formed by the condensation of vaporized metal species.

The term total incineration is used to reflect the conversion of waste to solidified slag and flue gases. Total incineration systems operate at temperatures approaching 1,649 °C (3,000 °F). This temperature level is in contrast to that used in conventional incineration which frequently operates at temperatures in the order of 982 °C (1,800 °F). In order to obtain fusion of incombustible residue, it is necessary to have temperatures in excess of 1,427 °C to 1,538 °C (2,600 to 2,800 °F); to ensure adequate fluidity of the slag, a temperature approaching 1,649 °C (3,000 °F) must be maintained in the slag zone. Generally, some limestone and possibly a small amount of fluorspar is required as a flux to aid in fusion and control fluidity of the slag. In the conventional grate-type, refractory-wall incinerators, the temperatures are kept below 982 °C to 1,093 °C (1,800 to 2,000 °F) through the use of excess air. The excess air provides cooling and thereby avoidance of the fluxing of refractories by fly-ash components. As a rule of thumb, 100% excess air is required to obtain temperatures under 1,093 °C (2,000 °F) with biological sludges containing 25% moisture.

There has been increasing controversy over the potential hazards of toxic-metal constituents in the ash produced by incinerators processing municipal sludges. As a result of these debates, EPA in 1988 established a municipal-waste combustion (MWC) ash research task force to identify research needs. Emphasis was placed on determining the distribution of lead and cadmium in municipal sludges.

Incineration is a disposal system if the incinerated materials are converted to water and gases which may be released directly to the atmosphere, and it is a volume reduction system if wastes are converted into an ash, which must then be disposed of or used. Incineration of municipal sludges is a reduction process. Incineration of sludges and toxic substances is discussed below:

1. Wastewater Treatment Plant Sludges: Incineration as a volume reduction system is being used to treat about 25% of the nation's wastewater sludges (Anon., 1984). Incineration systems require operational reliability which in turn requires consistency in the quality and quantity of sludge feed. While some municipalities are successfully operating sludge furnaces, others have had to cease operations because of repeated equipment breakdowns and higher operating costs than originally predicted.

There are three factors that determine the amount of energy that must be added to the incineration process, or in a few cases, the level of energy that can be recovered. These three factors are:

(a) thermal content of the sludge;

(b) the amount of excess air above the theoretical minimum required for combustion; and

(c) the water content of the sludge.

Sludges may burn without auxiliary fuel if the combustible solids content is as much as 25% to 35%. The heating value of dry raw sludge solids is about 11,630 to 37,220 kJ per dry kg (5,000 to 16,000 Btu per dry lb).

About 20% to 150% excess air above the theoretical amount is needed by conventional sludge incinerators to ensure complete and even mixing of air and sludge. Most of the auxiliary fuel is used to evaporate the water from the sludge.

Multiple hearth furnaces (MHF) are most commonly used for sludge incineration. In this system the sludge enters the furnace near the top and is pushed alternately to the center or the periphery of each hearth where it drops down to the next hearth. This type of incinerator must be heated or cooled very slowly. The system requires the use of an afterburner to destroy volatile organics, hydrocarbons, or odorous compounds.

Another type of furnace is the fluidized-bed furnace (FBF). In this case the odorous compounds, and toxic organic substances are usually destroyed in the incinerator chamber, and no afterburner is needed. However, pollution control devises are required to remove sand, ash, and heavy metals from the stack gases. The fluidized-bed furnace contains a sand bed into which air is injected, expanding the bed and reducing its density to the point where it responds as a fluid. While the FBF may require only 20% to 45% excess air, the particulate content of the untreated stack gases may be as high as 200 g/m^3. Operationally, the FBF is easier than the MHF system, but there may be sand damage to some of the pollution control devices.

2. Incineration of Toxic Chemicals: The conversion of wastes to carbon dioxide, water, hydrochloric acid, and carbon monoxide requires temperatures between 900 °C and 1200 °C (1,652 and 2,192 °F). Residence times in the high-temperature zones range from 0.2 seconds to several seconds.

Halogenated hydrocarbons are relatively difficult to incinerate completely. The destruction of these complex halocarbons occurs in a sequence of reaction steps: fragmentation and oxidation. Availability of hydroxide radicals may promote the rate of decomposition of hazardous compounds. Chlorocarbons slow down oxidation rates and are used as fire retardants. Chlorine serves as a hydroxide radical scavenger. High chlorine to hydrogen ratios in compounds generally tend to create soot. To alleviate the soot problem, it is necessary to use larger than normal quantities of excess air.

Air pollution is a potential problem with all incineration processes. Since incineration processes are not 100% efficient, many complications arise in the evaluation of the gases emissions. The problem occurs because there is incomplete combustion of wastes, or the synthesis of new compounds due to recombination of molecular fragments outside of the combustion zone complicates the analysis. Scrubbers are required to eliminate acid mists.

The accuracy of the information on which organic materials exit from an incinerator depends on the adequacy of the quality assurance and quality control procedures used in establishing stack sampling and emission analyses. For example, stack sampling must address the problem of measuring the presence of unmodified gaseous products in the stack emissions. In the determination of combustion by-products, the sampling is frequently focused on smaller, low-polarity molecules. Since the polar by-products have higher water solubility, these products, if formed, may be of greater toxicological significance.

Since incinerators discharge to the atmosphere, source configuration, topography, and ambient meteorology all strongly affect subsequent environmental transport and fate of chemicals. Stack emissions, gases, and particles are transported varying distances through the atmosphere until ultimately they are destroyed through such means as photo-decomposition or deposited on land or water surfaces. It is reasonable to assume that the segments of the biosphere impacted by the emissions from chemical waste incineration will be largely influenced by the dynamics of atmospheric and aquatic transport processes. Thus, biota may be impacted by:

(a) phase separation and chemical distribution between phases,

(b) interphase transport and air/water, air/solid, water/solid, air/biota, water/biota, and solids/biota, and

(c) photo- and biochemically-stimulated reactions involving incinerator emissions after discharge from the stack.

Uptake of emissions resulting from scrubber operations or fugitive emissions by terrestrial life may occur through air, water, soil, or food web. In general, the terrestrial food webs are as complex as their aquatic counterparts. The fate of toxicants emanating from incinerators in terms of biomagnification is not well understood (Anon., 1985).

The extent of incineration is typified by its use in solid waste disposal. Of the 117 MMT to 145 MMT (129-159 million tons) of municipal solid wastes produced in 1980, about 5.5 MMT (six million tons) were incinerated (Anon., 1988b). Sweden and Japan, respectively incinerate about 50% and 70% of their municipal waste. On the basis that only incinerators can reduce solid waste to ash, EPA estimates that as many as 311 additional municipal waste combustors with a capacity of 2.29×10^5 MT (252,000 tons) of municipal solid waste per day will be required in the near future. This compares with a 1985 design capacity of approximately 1.32×10^5 MT (145,000 tons) incinerated per day in more than 100 combustors. The industrialized cities of Europe have the same problems of wastewater and sludge management as their American counterparts (Shea, 1988).

WET AIR OXIDATION (WAO)

The wet air oxidation process provides a means for oxidizing combustibles by air or oxygen in the presence of liquid water. Increased efficiencies are obtained through the use of elevated temperatures and pure oxygen. Under such conditions, elevated pressures are required to maintain a liquid phase. The reaction is exothermic and therefore heat is produced which raises the temperature of the reactor contents. A wide variety of pressures and temperatures can be used to achieve destruction of combustible or organic materials. Under ideal conditions, organic substances are transformed into carbon dioxide, water, and ash. Excess heat can be recovered. In WAO, oxidation and hydrolysis reactions proceed simultaneously. If there is an inadequate supply of oxygen, hydrolysis reactions become significant and may generate products which are refractory to further oxidation. Inadequate transfer of oxygen may result in the generation of products such as low molecular weight, carboxylic acids (acetic, propionic, etc.). Mass transfer must be efficient. Pressure and mixing control the rate of transfer at a given temperature.

WAO occurs through a family of related oxidation and hydrolysis reactions. Temperatures of 175 °C to 320 °C (347 °F to 608 °F) and pressures of 2,067 kPa to 20,708 kPa (300 psig to 3,000 psig) are typical in WAO systems. Oxygen may be provided by either compressed air or a high pressure oxygen system.

Theoretically, WAO can proceed autogenously (self-sustaining) with chemical oxygen demand (COD) of about 15,000 mg/L as compared to 300,000 mg/L to 400,000 mg/L for incineration. Under ideal conditions sulfur is oxidized to sulfate and remains in the aqueous phase. Organic nitrogen is converted primarily to NH_3 and NO_x. Halogens remain in the aqueous phase. Metals generally remain in their aqueous phase (dissolved or suspended) after being converted to their highest oxidation state. The discharged gases under ideal conditions are primarily spent air and CO_2. Excellent destruction percentages have been reported. Bench-scale and full-scale results are shown in Tables 7 and 8, respectively (Deitrich, et al., 1985).

Some of the WAO systems have experienced high capital, operating, and maintenance costs when treating municipal sludges at 10 MPa (100 atm or 1,500 psi).

Catalysts may increase the destruction of more complex substances. Nitrate and bromine anions may facilitate higher organic destruction rates of organic chemicals at lower temperatures 165 °C to 250 °C (329 °F to 482 °F) as compared to conventional wet oxidation (Miller, 1980).

In batch ozonation and WAO experiments involving phenol, 2-chlorophenol, 1,2 dichloroethane and dimethylphthalate, acetic acid was not evident during ozonation but was a major end product of WAO (Baillod, et al., 1982). The reverse was true when oxalic acid was the organic substance. Ozonation destroyed all four pollutants in 5 to 10 minutes. The removal rate was limited by the rate of ozone mass transfer and the ozone utilization ratios indicated that 3.9 to 5.9 moles of ozone per mole of specific pollutant were consumed. In the case of batch WAO tests, conducted at 232 °C (450 °F), a significant amount of TOC remained in solution after the specific pollutant had been destroyed and the remaining TOC (mostly low-molecular weight acids, acetaldehyde and acetone) was oxidized slowly.

While the WAO process has high capital and operating costs, the total costs of sludge management might be reduced by using WAO after anaerobic digestion. At about 14.8 MPa (2,150 psi) and temperatures of greater than 275 °C (527 °F) the WAO treatment reportedly achieved about 86% volatile acid reduction (Wu, et al., 1987).

DEEP-WELL, SUBCRITICAL WATER OXIDATION

In 1975 the U.S. Environmental Protection Agency initiated support of a subcritical, WAO, Vertical Tube Reactor Pilot Plant Project at Lowry A.F.B., Colorado (Morrill, 1985). This deep-well reactor, 450 m (1,500 ft) deep and 6.35 cm (2.5 in) diameter, processed municipal sludge at a flow rate of 19L/min (5 gpm) and an operating temperature of 260 °C (500 °F).

Table 7. Bench-Scale WAO of Pure Compounds (Deitrich, et al., 1985)

Compound	Conditions (ºC/min.)	Starting Conc. (mg/L)	Final Conc. (mg/L)	Destroyed (%)
Acenaphthene	275/60	7000	0.5	99.99
Acrolein	275/60	8410	<3	>99.96
Acrylonitrile	275/60	8060	80	99.0
2-Chlorophenol	*275/60	12410	15	99.88
2,4-Dimethylphenol	275/60	8220	0.1	99.99
2,4-Dinitrotoluene	275/60	10000	26	99.74
1,2-Diphenylhydrazine	275/60	5000	6	99.88
4-Nitrophenol	275/60	10000	40	99.6
Pentachlorophenol	*275/60	5000	135	97.3
Phenol	275/60	10000	20	99.8
Formic Acid	300/60	25000	410	98.3
Chloroform	275/60	4450	3	99.9
Carbon Tetrachloride	275/60	4330	12	99.7
1,2-Dichloroethane	275/60	6280	13	99.8
N-Nitrosodimethylamine	275/60	5030	22	99.6
Hexachlorocyclopentadiene	300/60	10000	<15	>99.9
Toluene	275/60	4330	12	99.7
Nitrobenzene	*320/120	5125	255	95.0
Chlorobenzene	*275/60	5535	1550	72.0
Pyridine	*320/120	3910	570	85.4
2,4-Dichloroaniline	*275/60	259	<0.5	>99.8
2,4,6-Trichloroaniline	*320/120	10000	2.5	99.97
Dibutylphthalate	275/60	5230	26	99.5
Isophorone	275/60	4650	29	99.4
1-Chloronaphthalene	*275/60	5970	5	99.92
Pyrene	275/60	500	0.26	99.95
Malathion	250/60	11800	18	99.85
Kepone	*280/60	1000	690	31.0
Arochlor 1254	320/120	20000	7400	63.0
1,2-Dichlorobenzene	*320/60	6530	2017	69.1

*Catalyzed

Table 8. Full-Scale, WAO of Hazardous Organics (Deitrich, et al., 1985)

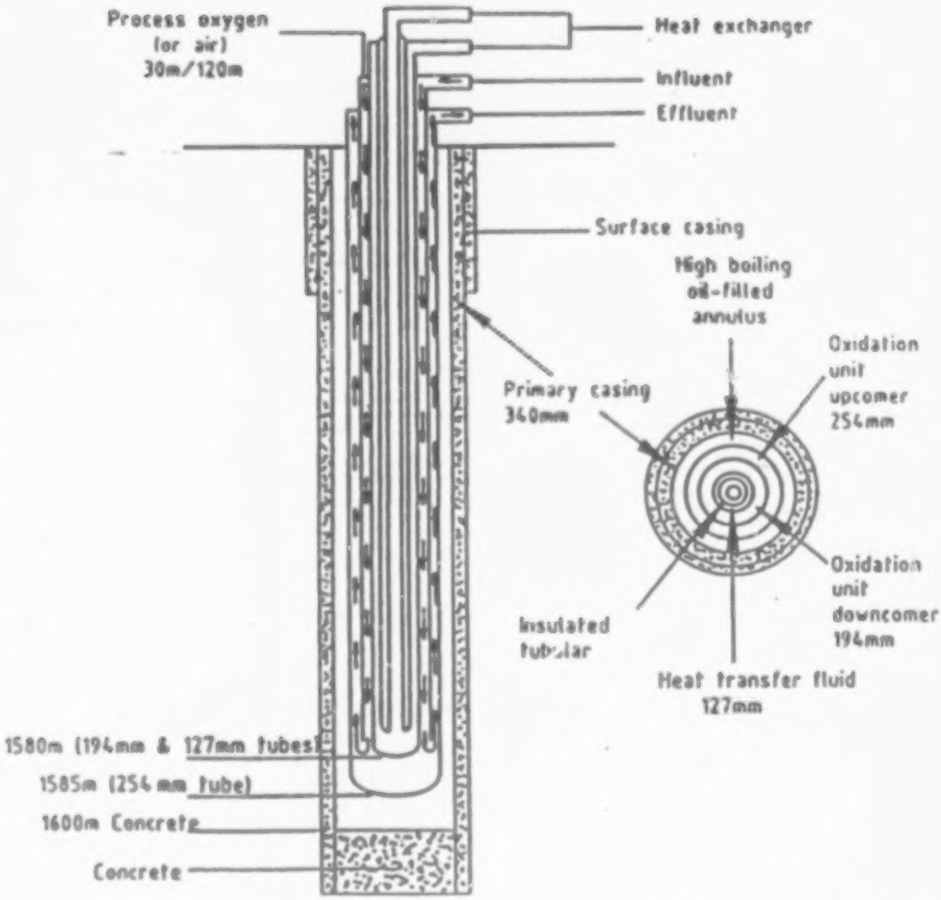
Study	Waste	Compound/ Parameter	Conditions (°C/min.)	Feed Concentration (mg/L)	Effluent Concentration (mg/L)	Removal (%)
A	Herbicide	Herbicide by-product	245/60	735	<5 to 13.3	98.2 to >99.3
B	Spent Caustic	COD	268/113	108,100	11,600	>89.3
		Total Phenols		15,510	36	99.8
		Organosulfur		3,010	180	94.0
C	Rocket Fuel	COD	271/117	42,130	2,540	94.0
		Hydrazine		12,700	<0.1	>99.99
		1,1-Dimethylhydrazine		9,250	<0.7	>99.99
D	Pesticide	COD	281/182	110,000	5,200	95.3
		DOC		26,600	1,070	96.0
		Dinoseb		37.1	0.186	99.5
		Methoxychlor		8.84	<0.018	>99.8
		Carbaryl		30.0	0.59	98.0
		Malathion		93.1	0.13	99.9

A full-scale unit was constructed and began operation in May 1984, at Longmont, Colorado (Morrill, 1985). The Longmont reaction vessel and flow diagram are more fully described in Figs. 1 and 2.

Originally the facility was designed to use compressed air. However, in November 1984 the oxygen source was changed to liquid oxygen which tripled the capacity and enhanced the operating range.

The reactor consisted of a tube having a diameter of 25.40 cm (10 in), a depth of 1,500 m (5,000 ft). The operating temperature was 300 °C (575 °F). The bottom hole pressure was 10.35 M Pa to 13.8 M Pa (1,500 to 2,000 psia). During the period from June 1984 to September 1985, the Longmont vertical reactor vessel operated 295 days and processed 1,283 dry tons of sludge. Organic destruction was 80% or greater. The ash passed EPA toxicity tests.

The successful Longmont experience led to advanced subcritical reactor designs and increased interest in supercritical operations. Table 9 presents comparisons of the available Oxidyne deep-well technologies.


Process oxygen
(or air)
30m/120m
Heat exchanger
Influent
Effluent
Surface casing
High boiling
oil-filled
annulus
Oxidation
unit
upcomer
254mm
Primary casing
340mm
Oxidation
unit
downcomer
194mm
Insulated
tubular
Heat transfer fluid
127mm
1580m (194mm & 127mm tubes)
1585m (254 mm tube)
1600m Concrete
Concrete

U.S. Patent No. 4,272,383

Figure 1. Longmont Reaction Vessel (Longmont, 1987)

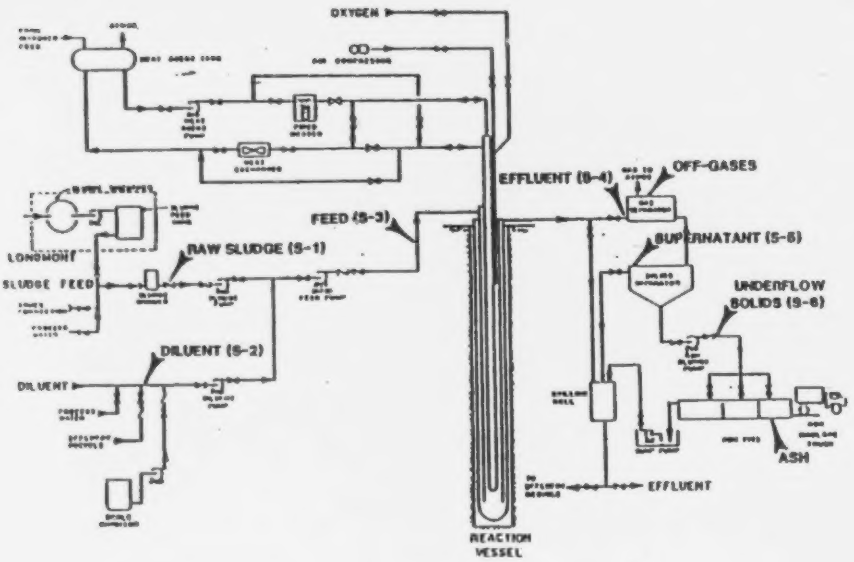

OXYGEN
EFFLUENT (S-4)
OFF-GASES
FEED (S-3)
SUPERNATANT (S-5)
LONGMONT
RAW SLUDGE (S-1)
SLUDGE FEED
UNDERFLOW
SOLIDS (S-6)
DILUENT (S-2)
DILUENT
ASH
EFFLUENT
REACTION
VESSEL

Figure 2. Longmont Flow Diagram (Longmont, 1987)

Table 9. Comparisons of Oxidyne Subcritical and Supercritical, Deep-Well Reactor Designs (Smith and Raptis, 1986)

Parameter	Subcritical	Supercritical
Well depth - m - ft	1,200-1,700 (4,000-5,500)	2,400-3,658 (8,000-12,000)
Temperature °C (°F)	260-320 (500-600)	400-510 (750-950)
Pressure KN/m^2 psia	10,000-14,000 (1,450-2,030)	22,000-31,000 (3,200-4,500)
Detention time (min)	30-40	0.1-2.0
COD removal (%)	80-85	100
Oxidant	oxygen gas	oxygen gas
Injection point	lower 1/2	lower 1/20
Velocity m/s (ft/s)	1.2-2.7 (4-9)	1.5-4.6 (5-15)
Applicability	sludges, organic wastes, some toxic wastes	all organic wastes
Waste Destruction Efficiency	depends on organic species range: 80-99.9%	99.99+ %

THE OXIDYNE DEEP-WELL, SUBCRITICAL WATER OXIDATION SYSTEM

The deep-well, subcritical sludge and liquid waste treatment system, Fig. 3, utilizes an enclosed process vessel. The reactor is within a conventionally drilled and encased well. This deep-well, subcritical reactor is generally considered to be about 1,524 m (5,000 feet) deep. This reactor is capable of providing the controlled pressure and temperature needed to complete reactions that will occur under subcritical water oxidation conditions. The use of natural hydrostatic pressure reduces the need for high-pressure sludge pumps, high-temperature and high-pressure surface reactors, heat exchangers, and the pressure-reducing methods that conventional above-ground systems require.

The Oxidyne system is applicable for handling a wide range of waste materials: municipal primary, secondary, and mixed sludges; industrial sludges; high-strength wastewaters containing organic materials; hazardous liquid wastes; and slurried solid wastes containing hazardous substances.

Seven patents, Table 10, describe the Oxidyne technology for processing waste streams in wet air (liquid phase) oxidative, pyrolytic (reduction), and supercritical oxidative environments.

Advantages of the Oxidyne concept may be summarized as follows:

- totally enclosed underground system;
- inherently safe;
- broad, patented technology base permits the use of a variety of pyrolytic and oxidative vertical-well process vessel designs to meet a variety of wastewater and sludge processing needs; and
- provides potential recovery of energy and by-products.

A reactor can be selected that is tailored to needs of the waste and the user. If the oxygen and wastewaters containing the sludges or toxic organic substances are carried downward in the reactor and sufficient pressures are reached to support liquid state oxidation, the wastes are converted into inert ash, carbon dioxide, and water.

In the case of the pyrolitic reactor, the wastes are pumped into the outer annular space of two vertical, concentric tubes. These wastes pass downward to the bottom of the reactor before returning through an inner annular space. Heat is introduced through the bottom of the reactor. Pyrolysis reduces the organic constituents in the waste by hydrolysis and carbonization reactions. The oxygen starved environment produces pyrolytic gas (methane, hydrogen, and carbon dioxide) and a carbon char.

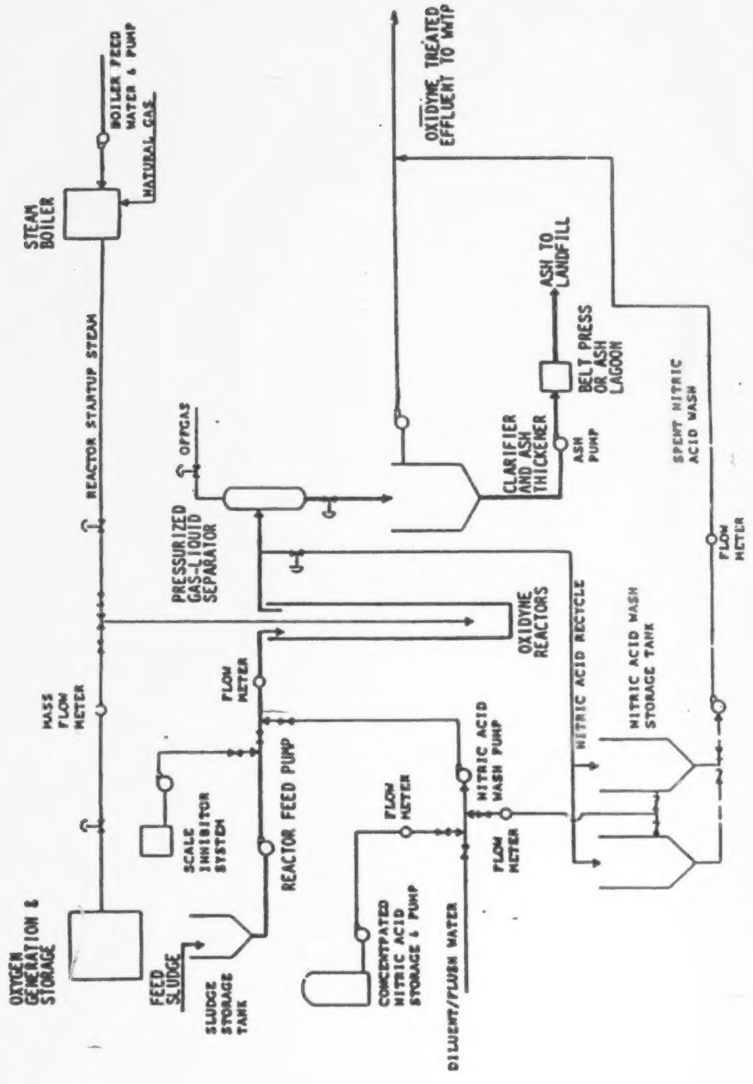

OXYGEN GENERATION & STORAGE
FEED SLUDGE
SLUDGE STORAGE TANK
SCALE INHIBITOR SYSTEM
REACTOR FEED PUMP
MASS FLOW METER
FLOW METER
REACTOR STARTUP STEAM
STEAM BOILER
BOILER FEED WATER & PUMP
NATURAL GAS
PRESSURIZED GAS-LIQUID SEPARATOR
OFFGAS
OXIDYNE REACTORS
CLARIFIER AND ASH THICKENER
ASH PUMP
BELT PRESS OR ASH LAGOON
ASH TO LANDFILL
OXIDYNE TREATED EFFLUENT TO WTP
SPENT NITRIC ACID WASH
FLOW METER
NITRIC ACID RECYCLE
NITRIC ACID WASH STORAGE TANK
NITRIC ACID WASH PUMP
FLOW METER
FLOW METER
CONCENTRATED NITRIC ACID STORAGE & PUMP
DILUENT/FLUSH WATER

Figure 3. Oxidyne Deep-Well Subcritical Water Oxidation System Flow Diagram (Oxidyne, 1988)

Table 10. Patents Held by Oxidyne Corp.

Inventor	U.S. Patent Number	Description
Bauer	3,449,247	Process for Wet Oxidation of Combustible Waste Materials (subcritical)
Lawless	3,606,999	Method for Carrying Out a Chemical/ Physical Process (deep-well subcritical)
Titmas	3,853,759	Dynamic Column Activation Method and Approaches (oxidation/reduction and hydrolysis without temperature or pressure limits).
Burleson	4,564,458	Method and Apparatus for Disposal of a Broad Spectrum of Waste Featuring Oxidation of Waste (supercritical oxidation)
Titmas	4,594,164	Method and Apparatus for Conducting Chemical Reactions at Supercritical Conditions (deep-well oxidation with metals extraction option)
Dickinson	4,292,957	Pollutant-free, Low-Temperature Slurry Combustion Process, Utilizing Supercritical State
Brothers	0/125,357 (Pending)	Method for Pre-Stressing Subsurface Well Casing

OPERATING RANGES

The major variables that affect the Oxidyne reactor selection are shown in Table 11.

PROCESS VESSEL DESIGN

Oxidyne deep-well process vessels are designed to treat a specific category of wastes. Important design considerations are:

(a) temperature at which the waste oxidizes;

(b) detention which influences degree of oxidation;

(c) heat released from oxidation;

Table 11. Oxidyne Reactor Operating Ranges for Combustible Wastes

Reactor Type	Oxidation (%)	Operating Temperature Range (°F)	Waste Processed
Pyrolitic subcritical temperature	None	350-635	Special industrial wastes
Partial oxidation, subcritical temperature	40-60	400-675	Municipal or nonhazardous industrial sludges
Full oxidation subcritical	75-95	525-675	Non-hazardous or hazardous municipal or industrial wastes
Pyrolytic/full oxidation subcritical	50-100	525-675	Non-hazardous or hazardous municipal or industrial wastes
Complete oxidation supercritical	100	725-925	Hazardous and toxic chemical wastes

(d) corrosivity of waste being processed and concentration of material to be processed; and

(e) concentration established by three interrelated variables.

The size of the subcritical, deep-well system is generally established by three interrelated variables. These are: organic load, flow and heat content of waste.

Standard down hole tubular sizes of materials, as well as conventional methods of construction are utilized. Construction considerations are as follows:

(a) well construction–drilling, well and casing requirements, pressure vessel construction, well head design, and modular unit requirement;

(b) reactor vessel design–upcomer, downcomer, monitoring;

(c) oxygen supply–oxygen generation, oxygen storage; and

(d) post-treatment–solids and ash handling, organic polishing, heat recovery, and ammonia nitrogen removal.

PROCESS VESSEL PERFORMANCE

Removal efficiencies by the deep-well, subcritical process can be defined by percentage destruction of organic substances, volatile solids, or specific compounds. Fortunately, in this process no known hazardous compounds are formed in the treatment of nonhazardous materials.

In some cases, pretreatment may be required. The maximum particle size of slurried wastes or sludges entering the reactor is probably-10 mesh (0.079 in.). Larger particles may create plugging problems in the reactor downcomer. Reactor feed and oxygen pumps are usually designed to operate at constant flow conditions ranging from 75% of design flow to 125% of design flow. Drastic changes in waste flow may create pumping problems. However, an equalization or pretreatment surge tank can eliminate surge problems. Other pretreatment requirements include pH adjustment and scale control.

Post-treatment of the reactor effluent consists of three major steps:

(a) separation of solid residue from the reactor effluent and dewatering of these solids,

(b) removal of dissolved organics, if needed, from the residue-free effluent, and

(c) recovery of heat from the effluent before or after solids separation.

Removal of the remaining organic material can be obtained through biological means. The short-chain organic materials, mostly acetic acid, are degradable.

Heat recovery is possible. If there is no recycle involved, the effluent may be in excess of 95 °C (203 °F).

Because municipal sludges contain from 3% to 5% by weight total nitrogen, ammonia can be expected in the upcomer prior to removal. The ammonia can be stripped from the effluent thereby reducing the amount of ammonia returned to the plant by 90%. This ammonia reduction is in contrast to a typical anaerobic digester sludge process where the digester supernatent, when returned to the plant headworks, contains most of the ammonia.

SIMS BAYOU SLUDGE PROCESSING FACILITY

The Oxidyne Sludge Processing Facility (SPF) consists of sludge pretreatment and equalization processes, an Oxidyne deep-well, process vessel (chemical oxidation reactor), post-treatment gas/liquid separation, cooling, ash-liquid separation, off-gas adsorption, ash dewatering and disposal. Since sludge must be processed continuously and only one deep-well reactor facility vessel is being constructed, the SPF system also includes a 100% redundant alternative sludge back-up dewatering and disposal system. This alternative system consists of polymer conditioning, belt press dewatering, lime stabilization, and disposal. Additional equipment includes liquid oxygen storage and vaporization facilities, a small start-up heater, nitric acid storage, and neutralization tanks for reactor cleaning, and standby lime storage and feeding facilities.

The SPF is located adjacent to the Sims-Bayou wastewater treatment facility on approximately 2.3 acres of land that is leased from the City of Houston. The SPF is designed to process an average of 40 dry tons per day (2,700 wet tons, if received at about a 1.5 percent concentration from City) of waste activated sludge from the Sims Bayou plant. The SPF is capable (with minor adaptations) to process up to 100 dry tons per day (6,750 wet tons). The SPF will receive waste activated sludge from the Sims Bayou gravity thickeners at a total solids concentration of between 1.0% and 2.0% and will produce a nonhazardous inorganic ash with a 50% to 60% solids concentration. The SPF is designed to provide removals of 95% TSS, 98% VSS, 93% COD, and 91% BOD. All wastewater streams generated during SPF operations will be collected and returned to the Sims Bayou plant for treatment and/or final disposal. Two basic types of SPF wastewater are listed below:

1. Process Return Flow
    - Oxidyne treatment system effluent
    - Alternative sludge processing filtrate
2. Plant Return Flow
    - All process wash water
    - Chlorinated effluent heat exchanger cooling water
    - Sanitary waste from SPF administration and solids handling building

The effluent quality of the above return streams will be continuously monitored to insure conformance with prescribed quality levels as specified in the operations contract with the Gulf Coast Waste Disposal Authority and the City of Houston. All unit processes that are expected to periodically generate wash water will be located within the solids handling building or on curbed concrete pads so that all drainage can be returned to the headworks of the Sims Bayou Wastewater Treatment Plant.

The sludge blending and storage tank, the belt presses for alternative sludge disposal, the pug mill and the associated polymer feed systems are all located within the solids handling building. Sludge leaving the blending-storage tank is metered, macerated, and analyzed prior to reaching the Oxidyne reactor vessel.

The Oxidyne system accomplishes wet oxidation of the sludge in a vertical process vessel constructed of concentric pipes. The end result of wet oxidation is similar to that of normal combustion in that oxygen is reacted with organic materials to form carbon dioxide, water, and simple organic acids. The primary difference between combustion and wet oxidation is that the oxidation reaction takes place in the liquid state. The reaction is accomplished by maintaining a pressured water system. The hydrostatic pressure is a critical aspect of achieving wet oxidation of the sludge.

The Sims Bayou facility consists of a 5,100 ft. deep well. The well is encased in a 16 inch casing that encloses a 12 1/2 in. diameter process vessel (4,000 to 5,000 ft.) containing an 8 5/8 in. internal baffle (3,900 to 4,900 ft.). As shown in Figure 4, the influent sludge is pumped down to the bottom of the vessel and returned in the annular space between the heat exchanger baffle and the pressure vessel wall. Flow directions are fully reversible. The annular space between the pressurized process vessel and the well casing are used to accommodate downhole monitoring devices, and provide a second level of protection against leakage. The annular space may be evacuated, flooded, pressurized, and used for emergency flushing. This void space might be purged with dry, pressurized nitrogen.

The long vertical reactor provides an extremely efficient counter flow heat exchanger which conserves the heat of reaction and allows relatively dilute organic wastes to be oxidized. Temperatures and pressures within the reactor will range from ambient to 340 °C (650 °F) and 138 kP to 17,240 kP (20 psig to 2,500 psig), respectively. Oxygen is injected in the very bottom of the reactor.

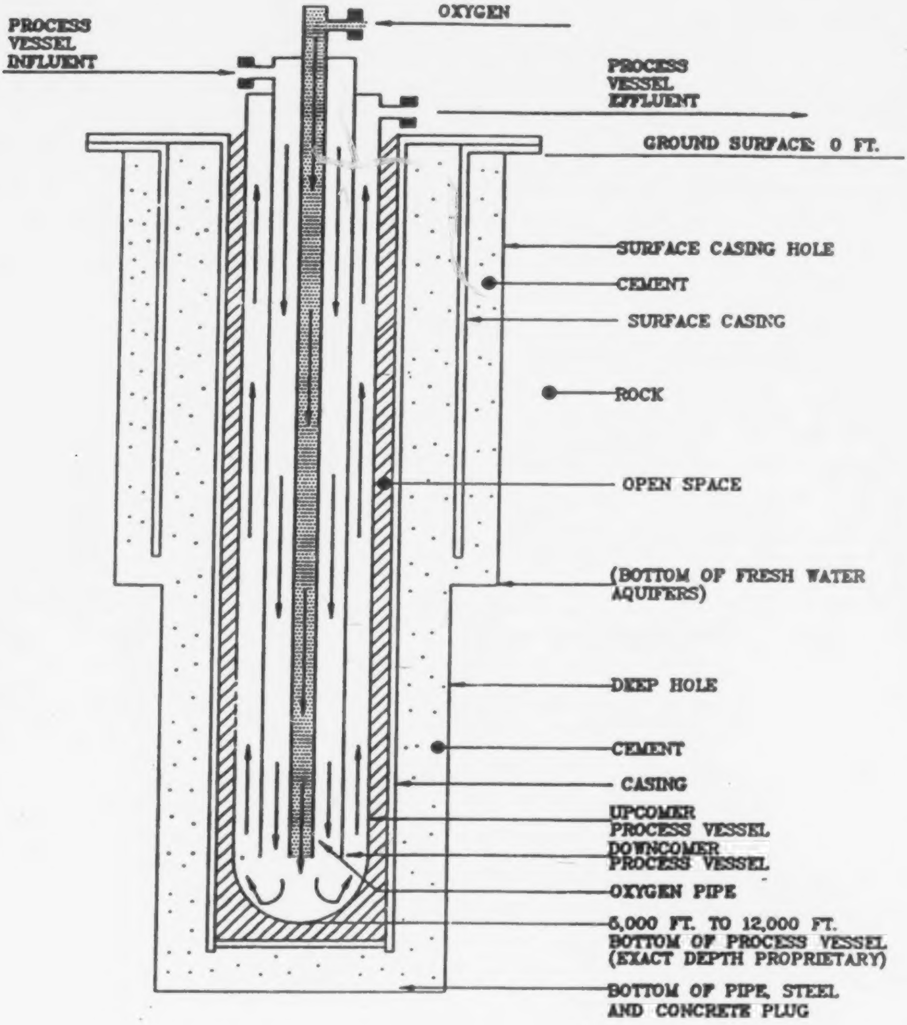

PROCESS VESSEL INFLUENT
OXYGEN
PROCESS VESSEL EFFLUENT
GROUND SURFACE: 0 FT.
SURFACE CASING HOLE
CEMENT
SURFACE CASING
ROCK
OPEN SPACE
(BOTTOM OF FRESH WATER AQUIFERS)
DEEP HOLE
CEMENT
CASING
UPCOMER PROCESS VESSEL
DOWNCOMER PROCESS VESSEL
OXYGEN PIPE
5,000 FT. TO 12,000 FT. BOTTOM OF PROCESS VESSEL (EXACT DEPTH PROPRIETARY)
BOTTOM OF PIPE, STEEL AND CONCRETE PLUG

Figure 4. Sims Bayou Deep Process Vessel (Oxidyne, 1988)

The reactor effluent flows under moderate pressure to a gas-liquid separator where the entrained gases, chiefly CO_2, are separated from the liquid stream. The liquid stream is then neutralized in a covered clarifier where the ash settles out. Chlorinated effluent water (CEW) from the Sims Bayou Waste Treatment Plant can be used to cool the reactor discharge before it enters the clarifiers. The ash slurry from the clarifiers will be pumped to belt filter presses and dewatered (50% to 60% solids) prior to disposal in an approved sanitary landfill. The clarifier overflow will contain approximately 1,500 mg/l of COD. This COD represents biodegradeable organic acids and some ammonia. In this case, the liquid stream will be returned to the headworks of the Sims Bayou Wastewater Treatment Plant.

In addition to the major processes described above, the SPF incorporates two subsystems that can be operated on an intermittent basis. These are: (1) the reactor start-up heating system, and (2) the acid wash system.

After establishing circulation, start-up heat is provided by injecting hot water and steam into the reactor to bring the bottom of the reactor and its contents up to an operating temperature of approximately 200 °C (400 °F). This system is used for initial reactor heating and for subsequent heating after temporary shutdown after each acid wash cycle.

The Oxidyne and the Vertec systems are substantially different in the mode of heating or cooling and the mode of oxygen introduction. They are similar in that they both use gravity for the development of pressure. Also, they are similar in the expected chemical reactions.

The differences are part of the public record available from the patent office in the form of the application changes of Dr. Jay McGrew. To obtain a patent, Dr. McGrew had to differ from Titmas and Bauer Patents. McGrew elected to convince the examiner his oil heater "heat exchanger" and the use of large bubbles "Taylor Bubbles" were unique, useful, and not obvious. It appears that Oxidyne can dilute or concentrate the stream faster and easier as compared to Vertec's ability to move heat through the walls of its heat exchanger. Small bubbles are more efficient for oxygen transfer than large bubbles. Large bubbles take up volume, reducing the pressure available for getting oxygen into solution. Large bubbles and the McGrew "Heat Exchanger" require additional volume and reduce the amount of product that can be pumped through the reactor.

The subcritical water oxidation process oxidizes heavy metals to their highest oxidation state. Therefore, about 75% to 99% of the heavy metals are bound up in sludge, converted to nonleachable metallic oxides, and incorporated into the inorganic ash. This nonleachability has been conclusively demonstrated by the previously mentioned EPA-Toxicity test performed for the Longmont project and by Oxidyne. The latter was conducted by Oxidyne using autoclaved sludges (mostly Sims Bayou Treatment Plant).

ENVIRONMENTAL CONSIDERATIONS

The development of a site plan and permit requests require evidence of performance. Stringent regulatory controls in conjunction with an environmentally sensitive public, require detailed operational and performance criteria and anticipated results. General criteria that are likely to be needed in the development of a site specific permit request are listed below:

(a) Zoning
(b) Surrounding Land Use
(c) Growth Trends
(d) Proximity to Residences & Other Properties
(e) Availability and Adequacy of Roads
(f) Type and Volume of Vehicular Traffic

Specific factors impacting on environmental considerations include:

Drilling Procedures: Oxidyne vessel design is a function of several requirements: temperature; degree of oxidation, a function of detention; exothermic heat; corrosivity of waste; and the concentration of organic material.

Oxidyne provides several standard subcritical and supercritical deep-well water oxidation designs. The depth of the Oxidyne process vessel is established by seventeen interrelated variables. For the Sims Bayou Treatment Plant, these variables in the order of significance are listed below:

(a) heat transfer rate required to preheat the down-flowing fluids with the up-flowing fluids;
(b) organic solids concentration, average flows, and deviations;
(c) dry tons of organic solids concentration;
(d) reaction time for selected temperatures and pressures;
(e) hydraulic flow rate, average, and deviations;
(f) imposed delivery pressure and vessel back pressure;
(g) selected peak operating temperature;
(h) integrated time and temperature duration;
(i) surface area of heat exchanging baffle;
(j) rate of mineral fouling;
(k) heat content of organic solids, average, and deviations;
(l) chemical oxidation demand reduction required;
(m) eccentricity of the nested concentric tubulars;

(n) selection of downflow and upflow annular passages;
(o) heat losses through the isolation space;
(p) age of the operation with reference to strata heat loss; and
(q) strata heat loss characteristics.

The deep process vessel consists of a long tubular baffle, heat injection tube, oxygen injection tube, monitoring tubes, and thermocouples. Design of the vessel and its component parts is accomplished through the sequential use of a number of mathematical models. These models involve various evaluations of reaction kinetics, external and internal heat transfer, reactor hydrodynamics and vessel stress conditions. The model is used to predict the pressures, velocities, residence times, percent removal, temperature profile, oxygen addition point, and other critical design features.

The construction materials required for the deep process vessel and containment casing are chosen for the desired application. The geology of a site dictates both surface and containment casing requirement, as well as cement composition. The metallurgy of the tubulars is of primary importance.

Structural integrity and prevention of environmental contamination has received considerable attention and Oxidyne's below-ground technology has addressed these problems. Traditionally, pressure testing is the accepted standard to determine the presence of a leak in downhole tubulars. This method of testing will be used on all of Oxidyne's containment casing and deep process vessel systems.

The containment casing must be large enough to permit the installation and retrieval of the process vessel and monitoring tubes on the outside of the vessel. The containment casing is cemented in place to the surrounding formation from the bottom of the hole back to ground surface. This cement must withstand the maximum operating temperature of the system. Also, the cement must exhibit desirable insulation properties. Heat loss from the reactor to the surrounding formation must be minimized. The surface casing is cemented in place to insure that there is no possible contamination of surface aquifers. The overall containment integrity is observed by using the monitoring tubes in the isolation space. Pressure readings will be recorded and fluid or gas samples will be obtained from the space between the external containment casing and the process vessel. Any leak into the containment area will be readily confirmed.

A standard oil field wellhead will be modified to accommodate the Oxidyne design. The deep process vessel and internal piping will hang from this wellhead.

Access: Transportation, whether truck, rail, barge, pipeline, or a combination must be evaluated for each location. Important factors include:

(a) traffic plan;
(b) on-site road construction requirements;
(c) environmental controls (mud, dust, noise, etc.);
(d) fencing; and
(e) security.

Process Description: An Oxidyne Sludge Processing Facility (SPF) consists of the following:

(a) sludge pretreatment and equalization processes;
(b) an Oxidyne deep-well chemical oxidation reactor;
(c) post-reactor, gas/liquid separation units;
(d) residue/liquid separation unit;
(e) cooling, heat exchanger;
(f) reactor effluent polishing (anaerobic) where required;
(g) off-gas destruction assembly;
(h) ash dewatering;
(i) residue and disposal area.

Appurtenances such as a liquid oxygen storage and vaporization facility, start up heater, cooling tower, pipe cleaning (possible nitric acid) storage, and chemical tanks support the SPF. If effluent polishing is required an anaerobic system may be installed along with a methane burner. If anaerobic digestion is required, excess heat from the Oxidyne system can be used to heat the digesters.

Water Pollution Control and Sanitation: For the Sims Bayou facility all wastewater streams generated as a result of housekeeping or process operations will be controlled. This includes surface drainage, process wash down, process return flows, stormwater runoff, and leakage into groundwater strata. All actual processing activities will be contained within curbed and drained concrete slabs. All wastewaters, with the exception of uncontaminated storm runoff will be returned to the wastewater treatment plant.

Process return flow will consist of the fluids remaining after the sludge has undergone deep-well oxidation. These process waters will have undergone substantial treatment in the deep-well reactor. After the entrained ash particles have been removed in the clarifiers, the return flow will be returned to the influent of the wastewater treatment plant where remaining organic wastes can be further treated biologically.

The cooling water, pre-thickener filtrate, washwater, and sanitary wastewaters from the plant also will be returned to the wastewater treatment plant.

Extensive measures will be taken to preclude any sludge or fluids within the deep-well reactor from entering an underground formation. As a first line of defense, surface casing will be set to seal off any potable water aquifers. This casing, in the case of Sims-Bayou, will be 2,000 feet deep. A second steel casing will be cemented inside the surface casing and will extend to the bottom of the hole where the end will be sealed by a concrete plug. And, finally, the deep-well process reactor (stainless steel pressure vessel) will be totally sealed. The annulus between the reactor and well casing will be continually monitored for leakage.

Three groundwater monitoring wells will be installed on the site.

Air Pollution Control: The deep process vessel will be a closed vessel and therefore there will be no emissions. The process will produce no particulates, CO, NO_x or SO_x. The only potential emission points will be from support equipment, and most of those are related to planned outages, upset situations, or the back-up system operations. The potential releases from these sources are so low that controls would be economically unreasonable and technically impractical. The gas separator, clarifier, residue storage, residue belt press hood, and anaerobic digesters might be possible sources of volatile organic materials. Should there be a problem, the gases could be ducted to a fume afterburner operating at 1,100 °C (2,000 °F) with a two second detention or carbon filter. The afterburner would be equipped with a supplemental source of both oxygen and methane.

Storage of Sludge: Sludge surging and equalization will be provided. The level of redundancy is dependant upon the location and the sludge handling plan. Ash storage will be provided. Alternative sludge handling during an emergency shut down will be available.

Fire Protection: A fire plan includes both standard city fire hydrant capability and the local fire extinguishers. The SPF will comply with all community "right to know" legislative requirements. Emphasis will be placed on storage of toxic and hazardous chemicals, access, emergency procedures, and other local requirements.

Ventilation: Ventilation equipment will conform to OSHA and NIOSH requirements.

Wind-blown Materials: The most likely material susceptible to being wind blown is quick lime. All handling facilities will be vented to the lime silo bag filter system.

Noise Pollution: Rotating equipment will be selected and located so that OSHA sound requirements will be met. Noise derived from traffic and rotating equipment will be evaluated for each design. Ear protective gear will be provided for maintenance personnel working within 50 feet of the nitrogen or oxygen equipment and the start-up heater.

Employee Sanitation: Sanitation facilities will be provided in accordance with the National Building Code and relevant State building and sanitation codes.

General Operations: The SPF is expected to operate continuously. Shut down will occur for maintenance and scale removal. However, such stoppages are expected to be no more than 5% of the time and occur once each month. A staff of 8 to 10 operators and 2 to 3 maintenance personnel is planned for the Sims Bayou Sludge Processing Facility. The professional and labor force required for 100 ton/day production is expected to be about the same as a facility processing only 40 ton/day.

-End-

APPENDIX A
SLUDGE MANAGEMENT

Sludge characterization, conditioning, dewatering, disposal, and applications are discussed below.

1. Sludge Properties: The amount of sludge derived from a treatment plant depends upon the biological, chemical, and physical processes utilized. For example 11.36 m^3 (3,000 gal) of primary sludge are produced per 3.785×10^3 m^3 (1×10^6 gal) of water treated as contrasted to nearly 75.7 m^3 (20,000 gal) of sludge produced per 3.785×10^3 m^3 (1×10^6 gal) of wastewater treated by the activated sludge process. The percent of suspended solids removed by primary and secondary biological treatment, activated sludge, is slightly greater than 90%. The amount of solids generated by the primary and secondary treatment process may be in excess of 0.179 kg/m^3 (1,500 lb/million gal) treated. Specific gravity of the solids is 1.33. The percent moisture of sludge generated by the activated sludge process is about 99%. The addition of metallic salts and lime for upgrading of the treatment process for phosphorus removal may increase the sludge volume by 20% to 30%.

Sludge characteristics affect the ultimate treatment and disposal. The major factors include the following: (a) particle density; (b) particle size distribution; (c) surface charge; (d) degree of hydration; and (e) compressibility, including sludge blanket and cakes. Particle density affects subsidence rate; particle size affects both thickening and dewatering, a decrease in average particle size creates an exponential increase in the surface to volume ratio, size affects compressibility, and the greater the surface area the larger the hydration (higher chemical demand) and resistance to dewatering; surface charge affects flocculation; hydration (adsorbtion of water layers) adversely affects moisture removal processes; and compressibility inhibits water removal. The technique most commonly used to capture and remove small particles is through the use of coagulation and flocculation. Properly conditioned raw primary sludge is more readily dewaterable as compared to either well-conditioned, digested, or activated sludges. Activated sludges are the most difficult to dewater. Flocculation occurs after the negative charge of the sludge particle is neutralized. Some level of surface water desorption is obtained and particulate bridging is completed. The thickening process removes most of the water between the cells. Dewatering can remove much of the capillary water, producing a solids content of 20% to 40%. Additional water removal can only be accomplished by drying or combustion.

2. Sludge Thickening: In a waste treatment plant, sludge thickening increases the solids content. Unit processes applicable for thickening are primary sedimentation, secondary sedimentation, elutriation, gravity thickening, dissolved air flotation, and centrifugation. Other applicable processes are physical straining and granular media filtration.

3. Sludge Stabilization: Stabilization is a term used to describe a process that makes sludge less odorous, putrescible, and dangerous. Most of the stabilization processes such as anaerobic and aerobic digestion substantially reduce the amount of suspended solids. Pathogen reduction in the case of municipal sludges is of great importance. Toxic metals may present a problem if present in excessive amounts.

4. Sludge Conditioning: All sludge conditioning processes are pretreatment operations involving water removal by thickening or mechanical dewatering processes. Conditioning methods generally employ polymer addition, inorganic chemical addition, elutriation, heat treatment, and possibly ash addition.

5. Sludge Dewatering: Dewatering devices include rotary vacuum filters, centrifuges, drying beds, lagoons, filter presses, and horizontal belt filters. Each system maybe uniquely applicable to a particular requirement. However, the belt filters are becoming increasingly more popular.

6. Sludge Reduction: Major reduction in sludge solids is obtained through the application of thermal processes. Sludges contain carbon, hydrogen, and sulfur which are combustible elements. However, because of the high moisture content of sludge, the value of sludge as a low-grade fuel may be questionable. The calorific value of raw sludge and anaerobically digested primary sludge, respectively, are 22 MJ/kg and 13 MJ/kg (9,500 and 5,500 BTU/lb) of dry solids. In the case of incineration, drying and combustion, a two-step process, may be done in separate units or successively in the same unit. Typical thermal processes include: incineration, wet air oxidation, heat drying, and pyrolysis. Important factors in evaluating incineration methods include the composition of the sludge feed and the amount of auxiliary fuel required. Air pollution control requirements and equipment, as well as ash disposal, are also important considerations. Multiple hearth, fluidized bed, and rotary kiln are the most common types of incinerators. Pyrolysis is a controlled combustion process. (Gloyna, 1988).

7. Residue Disposal: Historically, sludges and sludge residues have utilized land fills and ocean dumping as final disposal methods. Volume requirements and ecological considerations frequently have presented serious impediments to these disposal methods. Utilization of surface disposal methods such as cropland

application and land reclamation have been utilized; but there are constraints. For example, sometimes it is necessary to drastically limit the application rates. It is also necessary to reduce the amount of sludge because of hazardous wastes in the sludge. Unsatisfactory sludge and availability of land are two overriding concerns in the disposal of residues. Transportation is also very expensive for this disposal.

8. Characterization of Sludge and Sludge-Soil Systems: The characterization of wastewater treatment plant sludges is important in evaluating the ultimate fate of various components. The chemical composition of sludges may be summarized as follows: (Sommers, et al., 1984)

a. Fatty acid esters and phthalates are predominant chemical forms present in nonaqueous extracts of sludge.
b. Monomers of hemicellulose and cellulose polymers make up 0.99% to 2.55% of sludge-oven dry weight.
c. Organic nitrogen in the sludges are present primarily as alpha-amino acid nitrogen which constitutes about 31% to 36.5% of the organic nitrogen.
d. The light fraction (organics) and heavy fraction (inorganics) respectively, are about 8% to 26% and 69% to 88% of the sludge (dry weight basis).
e. Most of the metals are associated with the light fraction of the organic portion of the sludge.
f. Calcareous sludges exhibit a higher capacity to retain added metals as compared to noncalcareous sludges.
g. Metal retention is directly related to sludge pH (chemical precipitation occurs at a pH above 5.0 resulting in carbonate precipitation and removal of Cd, Cu, Ni, and Zn from solution).
h. The retention of each of the above-named metals decreases in accordance with the following order: carbonate > organic matter > hydrous oxides.

9. Nutrient Characteristics: Sludges contain varying amounts of nutrients. If the volumes are not overpowering and there are no toxic considerations, sludges can serve a useful purpose. For example, in 1980 Texas produced about 36,400 MT (40,000 DT) of wastewater sludges. This amount of sludge could have provided 331 kg (730 lb) of nitrogen to more than 29,600 ha (73,000 ac) of cropland (Jensen, 1987). Today, roughly 29,600 ha (73,000 ac) are registered with the Texas Department of Health as application sites. More than 85,200 ha (210,500 ac) of farmland in the U.S. have received municipal sludges (EPA, 1986). Unfortunately, the sludges sometimes contain toxic substances.

10. Toxic Characteristics: Wastewaters and sludges containing organic materials represent the largest fraction of toxic and hazardous wastes produced in this country. All of these effluents and sludges must be treated and detoxified prior to release to the environment. Also, sludges derived from secondary biological treatment plants, both industrial and municipal, while not necessarily toxic, present a tremendous problem because of the large volume that must be handled and ultimately reintroduced into the environment.

APPENDIX B
U.S. CUSTOMARY TO METRIC CONVERSION FACTORS

U.S. Customary Unit			Metric Unit	
Name	Symbol	Multiplier	Name	Symbol
Acre	acre	4.047×10^3	Square meter	m^2
		0.047	Hectare	ha
British thermal unit	Btu	1.055	Kilojoule	kJ
Cubic feet per day	ft^3/day	3.277×10^{-7}	Cubic meters per second	m^3/s
Cubic feet per gallon	ft^3/day	7.482×10^{-3}	Cubic meters per liter	m^3/L
Cubic feet per hour	ft^3/hr	7.867×10^{-6}	Cubic meters per second	m^3/sec
Cubic feet per million gallons	ft^3/Mgal	7.482	Milliliters per cubic meter	mL/m^3
Cubic feet per minute	ft^3/min	4.719×10^{-4}	Cubic meters per second	m^3/sec
Cubic feet per minute per 1,000 cubic feet	ft^3/min/ 1,000 ft^3	$1{,}667 \times 10^{-2}$	Liters per cubic meter per second	L/m^3/sec
Cubic feet per minute per 1,000 gallons	ft^3/min/ 1,000 gal	0.1247	Liters per cubic meter per second	L/m^3/sec
Cubic feet per pound	ft^3/lb	6.243×10^{-2}	Cubic meters per kilogram	m^3/kg
Cubic feet per second	ft^3/sec	2.832×10^{-2}	Cubic meters per second	m^3/sec
Cubic feet per second per acre	ft^3/acre/sec	6.997×10^{-6}	Cubic meters/sq m/second	m^3/m^2/sec
Cubic feet per second per square mile	ft^3/mi^2/sec	1.093×10^{-8}	Cubic meters per square meter per second	m^3/m^2/sec
Cubic foot	ft^3	2.832×10^{-2}	Cubic meter	m^3
		28.32	Liter	L
Cubic inch	in^3	16.39×10^{-6}	Cubic meter	m^3
		16.39	Milliliter	mL
Cubic yard	yd^3	0.7646	Cubic meter	m^3
Cycles per day	cycle/day	1.157×10^{-5}	Hertz (cycles per second)	Hz

Appendix B--U.S. Customary Conversion Factors (continued)

U.S. Customary Unit			Metric Unit	
Name	Symbol	Multiplier	Name	Symbol
Degrees Fahrenheit	°F	0.556 (°F - 32)	Degrees Centigrade	°C
Feet per day	ft/day	3.528×10^{-6}	Meters per second	m/sec
Feet per hour	ft/hr	8.467×10^{-5}	Meters per second	m/sec
Feet per minute	ft/min	5.08	Millimeters per second	mm/sec
Foot	ft	0.3048	Meter	m
		0.3048×10^{-3}	Kilometer	km
Foot-pounds per inch	ft-lb/in	53.386	Joules per meter	J/m
Foot-pounds per second	ft-lb/sec	1.355	Watt	W
Gallon	gal	3.785×10^{-3}	Cubic meter	m^3
Gallons per day	gal/day	4.381×10^{-5}	Liters per second	L/sec
		3.785×10^{-3}	Cubic meters per day	m^3/day
Gallons per day per mile	gal/day/mi	2.72×10^{-11}	Cubic meters/meter/second	m^3/m/sec
Gallons per day per square ft.	gal/day/ft^2	4.715×10^{-7}	Meters per second	m/sec
Gallons/day/1,000 sq ft	gal/day/1,000 ft^2	4.074×10^{-2}	Liters/square meter/day	L/m^2/day
Gallons per hour	gal/hr	1.051×10^{-6}	Cubic meters per second	m^3/sec
Gallons per mile	gal/mi	2.352	Milliliter per meter	mL/m
Gallons per minute	gal/min	6.308×10^{-5}	Cubic meters per second	m^3/sec
Gallons per pound	gal/lb	8,344	Milliliter per kilogram	mL/kg
Gallons per ton	gal/ton	4.173	Milliliter per kilogram	mL/kg
Kilowatt-hours per year	kWhr/yr	15.2096	Kilowatts per year	kW/yr
Mile	mi	1.609	Kilometer	km
Miles per hour	mi/hr	0.4469	Meters per second	m/sec
		1.609	Kilometers per hour	km/hr

Appendix B--U.S. Customary Conversion Factors (continued)

U.S. Customary Unit			Metric Unit	
Name	Symbol	Multiplier	Name	Symbol
Million gallons per day	Mgal/day (MGD)	4.383 x 10^{-2}	Cubic meters per second	m^3/sec
Million gal per day per acre	Mgal/acre/day	1.083 x 10-5	Meters per second	m/sec
		9.353	Megaliters per hectare per day	ML/ha/day
Parts per million	ppm	1.0	Milligrams per liter	mg/L
Pound (mass)	lb	0.4536	Kilogram	kg
Pound-foot	lb-ft	1.356	Newton-meter	N m
Pounds per acre per day	lb/acre/day	1.297 x 10^{-9}	Kilograms per sq meter/sec	kg/m^2/sec
		1.121	Kilograms per hectare/day	kg/ha/day
Pounds per cubic foot	lb/ft^3	16.02	Kilograms per cubic meter	kg/m^3
Pounds per cubic foot/hour	lb/ft^3/hr	[illegible]449 x 10^{-3}	Kilograms/cubic meter/second	kg/m^3/sec
Pounds per 1,000 cubic feet	lb/1,000 ft^3	16.02	Grams per cubic meter	g/m^3
Pounds per cubic yard	lb/yd^3	0.5933	Kilograms per cubic meter	kg/m^3
Pounds per day	lb/day	5.25	Milligrams per second	mg/sec
Pounds per day per acre	lb/day/acre	0.1121	Grams per square meter per day	g/m^2/day
Pounds per day per cubic foot	lb/day/ft^3	16.02	Kilograms per cubic meter/day	kg/m^3/day
Pounds per day per square foot	lb/day/ft^2	56.51	Milligrams per sq meter/second	mg/m^2/sec
Pounds per gallon	lb/gal	0.1198	Kilograms per liter	kg/L
Pounds per hour	lb/hr	1.26 x 10^{-4}	Kilograms per second	kg/sec
Pounds per hour per sq ft	lb/hr/ft^2	4.882	Kilograms per sq meter/hr	kg/m^2/hr
Pounds per hour per cu ft	lb/hr/ft^3	4.448 x 10^{-6}	Kilograms per liter per second	kg/L/sec
Pounds per horsepower-hour	lb/hp-hr	0.6081	Kilograms per kilowatt-hour	kg/kWhr
Pounds per million gallons	lb/Mgal	0.1198	Grams per cubic meter	g/m^3
Pounds per pound	lb/lb	1,000	Grams per kilogram	g/kg

Appendix B–U.S. Customary Conversion Factors (continued)

U.S. Customary Unit			Metric Unit	
Name	Symbol	Multiplier	Name	Symbol
Pounds per square foot	lb/ft^2	4.883	Kilograms per square meter	kg/m^2
Pounds per square inch (force)	psi	6,895	Pascal	Pa
Pounds per 1,000 cubic feet	lb/1,000 ft^3	16.02	Grams per cubic meter	g/m^3
Pounds per 1,000 gallons	lb/1,000 gal	1.198 x 10^2	Grams per cubic meter	g/m^3
Pounds per year per acre	lb/yr/acre	1.121	Kilograms per hectare per year	kg/ha/yr
Pounds per year per cubic foot	lb/yr/ft^3	16.02	Kilograms/cubic meter/year	kg/m^3/yr
Pounds per year per square foot	lb/yr/ft^2	4.882	Kilograms per square meter/yr	kg/m^2/yr
Square foot	ft^2	9.29 x 10^{-2}	Square meter	m^2
Square inch	in^2	6.452 x 10^{-4}		
Square meter	m^2			
Square mile	mi^2	2.59	Square kilometer	km^2
Square yard	yd^2	0.836	Square meter	m^2
Tons per acre	ton/acre	0.2242	Kilograms per square meter	kg/m^2
Tons per cubic yard	ton/yd^3	1.187	Megagrams per cubic meter	Mg/m^3
Watt-hour	Whr	3.6 x 10^3	Joule	J
Yard	yd	0.9144	Meter	m

APPENDIX C

A GLOSSARY OF TERMS

Common terms used to define or describe the application of deep-well, subcritical and supercritical water oxidation of industrial wastewaters and industrial/municipal sludges are included in this glossary. The object is to compile and define the most common words and terms frequently used in deep-well, subcritical and supercritical water oxidation systems. Not all terms common to the broader field of engineering, waste treatment, heat treatment, reaction kinetics, and associated terminology are included. Acknowledgment is extended to numerous sources. (Studdardt, 1974)

The terms most commonly used are described as follows:

abatement: Method of reducing the degree or intensity of pollution, also the use of such a method.

absorption: Penetration of a substance into or through another. For example, in air pollution control, absorption is the dissolving of a soluble gas, present in an emission, in a liquid which can be extracted.

activated sludge: Sludge that has been aerated and subjected to bacterial action, used to remove organic matter from domestic and industrial wastewaters.

adsorption: Adhesion of a substance to the surface of a solid or liquid. Adsorption is often used to extract pollutants by causing them to be attached to such adsorbents as activated carbon or silica gel. Hydrophobic, or water-repulsing adsorbents, are used to extract oil from waterways in oil spills.

aerobic: Life or processes that can occur only in the presence of oxygen.

aerobic digestion: Aerobic process where the influent volatile solids are typically 50% to 80%. The volatile solids destroyed range from 33% to about 70%. The return stream suspended solids concentration may be in the range of 5,000 mg/l to 30,000 mg/l.

anaerobic: Life or processes that occur in the absence of oxygen.

anaerobic treatment: Process employing the degradation and breakdown of organic solids (sludges) or soluble organics to gaseous end products. The process occurs in two stages, an initial breakdown to organic acids followed by fermentation of the organic acids to methane and carbon dioxide.

autogenous: Plant operations that require no external influence, especially heat, to proceed and maintain process temperatures; self-sustaining.

autotrophic: Self-nourishing; denoting those organisms capable of constructing organic matter from inorganic substances.

bacteria: Single-celled microorganisms that lack chlorophyll. Some bacteria are capable of causing human, animal, or plant diseases; others are essential in pollution control because they break down organic matter in the air and in the water.

Best Available Demonstrated Control Technology: Control technology which provides the basis for the establishment of New Source Performance Standards.

Best Available Technology Economically Achievable: Control technology applicable to effluent limitations to be achieved by July 1, 1984, for industrial dischargers to surface waters, as defined by CWA §§ 301 (b) (2) (A) and 304 (b) (2) (B).

Best Conventional Pollutant Control Technology: Technology applicable to effluent limitations to be achieved by July 1, 1984, for industrial dischargers to surface waters, as defined by CWA §§ 301 (b) (2) (E) and 304 (b) (4) (B).

Best Practicable Control Technology Currently Available: Control technology applicable to effluent limitations to be achieved by July 1, 1977, for industrial discharges to surface waters, as defined by CWA §§301(b) (1) (A) and 304 (b) (1) (B).

biochemical oxygen demand (BOD): Measure of the amount of oxygen consumed in the biological processes that breaks down organic matter in water. Large amounts of organic waste use up large amounts of dissolved oxygen, thus the greater the degree of pollution, the greater the BOD.

biological oxidation: Process by which bacteria and other microrganisms feed on complex organic materials and decompose them. The process is also called biochemical oxidation.

biological treatment: Use of the metabolic processes of microorganisms to break down organic hazardous constituents into non-hazardous substances.

BOD_5: Amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter in an effluent.

capacity or effective capacity: Measured as (or converted to) the annual mass throughput of hazardous waste through a treatment or disposal technology or system according to practical operating maximums for these systems considering routine down time for repairs and maintenance, discharge limits in various permits, electrical outages, and other factors as defined by the respondent.

catalytic agent: Substance which, by its mere presence, alters the velocity of a reaction and may be recovered unaltered in nature or amount at the end of the reaction.

cemented casing: Enclosing shell made of cement to case the containment pipe.

chemical oxygen demand (COD): Measure of the amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water. The COD test, like the BOD test, is used to determine the degree of pollution in an effluent.

chemical treatment: Group of processes utilizing neutralization, precipitation, oxidation, and other chemically-based techniques to treat or immobilize hazardous constituents in a waste stream. Can occur in tanks or surface impoundments.

combined sewers: Sewerage system that carries both sanitary sewage and storm water runoff. During dry weather, combined sewers carry all waste water to the treatment plant. During a storm, only part of the flow is intercepted because of plant overloading; the remainder goes untreated to the receiving stream.

containment pipe: Pipe that is cemented into the earth to protect the deep-well reactor from the earth; also referred to as encasement barrier or long string.

critical point: Thermodynamic state that corresponds to the highest temperature and pressure for gas and liquid phases of a pure substance to coexist in equilibrium; also referred to as gas-liquid critical point.

critical pressure: Pressure under which a substance may exist as a gas in equilibrium with a liquid at the critical temperature.

critical temperature: Temperature above which a gas can not be liquified by pressure alone.

decomposition: Reduction of the net energy level and change in chemical composition of organic matter because of the actions of aerobic or anaerobic microorganisms. The chemical separation of a substance into two or more substances, which may differ from each other and the original substances.

deep-well injection: Disposal of high-concentration liquid wastes in otherwise unusable underground aquifers via pressurized wells.

deep-well, subcritical or supercritical water oxidation reactor: Type of reactor that is built in a deep vertical hole to make use of hydraulic head to build up process pressure; also referred to as deep process vessel or vertical tube reactor or gravity pressure vessel. Dimensions of a deep-well subcritical and supercritical water oxidation reactor may be 1 ft in diameter, and up to 5,000 ft and 10,000 ft in depth, respectively.

dielectric constant: Dielectric constant of a medium is define by

$$F = \frac{QQ'}{\epsilon r^2}$$

Water at normal conditions has a dielectric constant of about 80, which is due to the strong hydrogen bonding capability of the dense, polar water. Hydrogen bonding is a short-range force, so it has a diminished influence as the density of water decreases in the critical region. The load density of supercritical water lowers its dielectric constant and hydrogen bonding capability, although hydrogen bonding to some extent may still exist up to 400 °C or at very high pressures. The dielectric constant for water near the critical point has been reported to be between 2.5 and 15, similar to polar organic solvents.

dissolved solids: Total amount of dissolved material, organic and inorganic, contained in water or wastes.

downcomer: Passage in which a slurry or liquid is conducted from the top of the reaction vessel or heat exchanger to the bottom.

effluent limitation guidelines: U.S. guidelines on the technology-based limitations achievable by industrial categories and subcategories, representing the minimum level of treatment required for an affected industry unless a variance is obtained.

EIS: See Environmental Impact Statement.

endothermic: Characterized by or formed with absorption of heat.

environmental impact statement: Statement on the environmental consequences of, and alternatives to a major federal action; required by Section 102 (2) (C) of NEPA.

exothermic: Characterized by or formed with evolution of heat.

fluidity: Reciprocal of viscosity. The viscosity of supercritical water increases directly with fluid density, and at a density of 100 kg/m^3 (0.1 g/cm^3) is about 0.1 that of normal water. Similarly, since diffusivities and ion mobilities are inversely related to viscosity, they may be ten-fold higher in supercritical water.

hazardous substance: Substance designated under 40 C.F.R. Part 116 as having the potential to present an imminent and substantial danger to the public health or welfare, pursuant to Section 311 of CWA.

hazardous waste: Waste that is ignitable, corrosive, reactive, and toxic. Wastes regulated as hazardous under the federal and/or a state's RCRA program, plus PCB wastes.

Henry's Law: Mass of a slightly soluble gas dissolved in a definite mass of a liquid at a given temperature is very nearly directly proportional to the partial pressure of that gas.

hydrolysis: Double composition reaction involving the splitting of water into its ions and the formation of a weak acid or base, or both.

inboard passage: Inside annulus of a deep-well reactor that may have fluid moving upward (upcomer) or downward (downcomer).

incineration: Controlled process by which solid, liquid or gaseous combustible wastes are burned and changed into gases; the residue produced contains little or no combustible material.

land disposal or disposal: Includes all other nontreatment technologies except storage and transportation.

land treatment: Placement of hazardous waste on or in a surface layer of soil (to render it nonhazardous through biological decay).

landfill: Containment of hazardous waste in on-ground or below-ground repositories that are lined with layers of impermeable material.

mixed liquor: Mixture of activated sludge and water containing organic matter undergoing activated sludge treatment in the aeration tank.

NEPA: National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 et seq.

NPDES: National Pollutant Discharge Elimination System.

New Source Performance Standards: Effluent standards for new sources established pursuant to CWA § 306 (b) (1) (B).

nonpoint source: Source of water pollution or pollutants not associated with a discrete conveyance, including runoff from fields, forest lands, mining, and construction activity and salt water intrusion.

outboard passage: Outside annulus of a deep-well reactor that may have fluid moving upward (upcomer) or downward (downcomer).

outfall: Point where sewage or drainage discharges from a sewer, drain, or conduit.

oxidation: A chemical reaction in which oxygen unites or combines with other elements. Any process which increases the proportion of oxygen or acid-forming element or radical in a compound. Organic matter is oxidized by the action of aerobic bacteria; thus oxidation is used in wastewater treatment to break down organic wastes.

pH: A unit for measuring hydrogen ion concentration. A pH of 7 indicates a "neutral" water or solution. At pH lower than 7, a solution is acidic. At pH higher than 7, a solution is alkaline.

point source: Any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which pollutants are or may be discharged. The term does not include return flows from irrigated agriculture. 40 C.F.R. §122.2

pollutant: Introduced gas, liquid, or solid that makes a resource unfit for a specific purpose.

pollution: Presence of matter or energy whose nature, location, or quantity produces undesired environmental effects.

primary treatment: First stage in waste water treatment in which substantially all floating or settleable solids are mechanically removed by screening and sedimentation.

publicly owned treatment works: Municipal or industrial liquid waste treatment plant which is owned by a State or municipality.

pyrolysis: Chemical decomposition by extreme heat. Starved air combustion is a partial pyrolysis process.

raw sewage: Untreated domestic or commercial wastewater.

recovery/recycling: Reclamation, via separation and purification, of usable substances from hazardous waste and the reuse of these substances.

reduction: Any process which increases the proportion of hydrogen or base-forming elements or radicals in a compound.

secondary treatment: Wastewater treatment, beyond the primary stage, in which bacteria consume the organic parts of the wastes. Effective secondary treatment removes virtually all floating and settleable solids and approximately 90% of both BOD_5 and suspended solids. Customarily, disinfection by chlorination is the final stage of the secondary treatment process.

sewage: Total or organic waste and wastewater generated by residential and commercial establishments.

sewerage: Entire system of sewage collection, treatment, and disposal. Also applies to all effluent carried by sewers whether it is sanitary sewage, industrial wastes, or storm water runoff.

sludge: Solids removed from sewage during wastewater treatment. Sludge disposal is then handled by incineration, dumping or burial.

solar evaporation: Process of dewatering hazardous wastes in a surface impoundment by evaporation of the water fraction of the wastes.

solidification/stabilization: Conversion of liquid hazardous constituents into immobile solid forms by chemical or evaporative processes.

solvation characteristics: Solvation characteristics of supercritical water change with increasing temperature and pressure. Organic liquids that are sparingly soluble in normal water can be completely miscible with supercritical water. The solubility and dissociation of inorganic salts in a fluid occur when the temperatures are beyond the near-critical region (450 °C) and if the density is kept low (below 300 kg/m^3) which lowers the dielectric constant of water to below 2. However, at very high pressures sufficient to keep the density near or above 1,000 kg/m^3 (1 g/cm^3) water can again dissociate salts and increase their solubility for the very low values of low densities. Solvation properties of supercritical water (between 400 and 700 °C and near critical pressures 22-30 MPa) exhibit the properties of a dense gas with high solubility of organics, complete miscibility in all proportions with oxygen, high diffusivities, low viscosity, and low solubility of ionic inorganics.

stablization: Process of converting activated organic matter in wastewater sludge or solid wastes into inert, harmless material.

storm sewer: Conduit that collects and transports rain and snow runoff back to the ground water. In a separate sewerage system, storm sewers are entirely separate from those carrying domestic and commercial waste water.

supercritical water: Fluid is considered supercritical if its temperature and pressure both exceed their critical values. Supercritical conditions exist for water at temperatures above 374 °C (705°F) and pressures above 22.1 MPa (3,200 psia). The near-critical region is where many great changes in solvent behavior occur, and for water includes the area where density ranges from 200 to 700 kg/m^3 (0.2 to 0.7 g/cm^3) and temperatures are between 350 °C and 450 °C.

superfund wastes: Wastes originating from cleanup activities at hazardous waste sites where these activities are funded by Superfund monies.

surface casing: Steel pipe that is cemented in the surface section of a well to protect fresh water.

suspended solids (SS): Small particles of solid pollutants in wastewaters that contribute to turbidity and that resist separation by conventional means. The examination of suspended solids and the BOD test constitute the two main determinations for water quality performed at waste water treatment facilities.

tertiary treatment: Wastewater treatment beyond the secondary, or biological stage that includes removal of nutrients such as phosphorus and nitrogen, and a high percentage of suspended solids. Tertiary treatment, also known as advanced waste treatment, produces a high quality effluent.

thermal conditioning: Thermal conditioning utilizes lower pressure/lower temperature and wet air oxidation. While solids are typically 1.5% to 15% with influent volatile solids concentrations of 50% to 80% resulting in volabile solids destruction of 30% to 40% and a return stream containing suspended solids of 1,000 mg/l to 5,000 mg/l.

thickening: Sludge thickening is a process designed to reduce the volume occupied by sludge and thereby increase the solids content of the sludge.

treatment: Includes all thermal and nonthermal treatment technologies including stabilization/solidification.

upcomer: Passage in which a slurry or liquid is conducted from the bottom of the reaction vessel or heat exchanger to the top.

waste: (1) bulky waste -- items whose large size precludes or complicates their handling by normal collection, processing or disposal methods; (2) construction and demolition waste -- building materials and rubble resulting from construction, remodeling, repair and demolition operations; (3) hazardous waste -- wastes that require special handling to avoid illness or injury to persons or damage to property; (4) special waste -- those wastes that require extraordinary management; (5) wood pulp waste -- wood or paper fiber residue resulting from a manufacturing process; (6) yard waste -- plant clippings, prunings and other discarded material from yards and gardens.

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